American Bee Journal

Vol. 95 No. 9 SEPTEMBER 1955

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HAMILTON, ILLINOIS

Vol. 95, No. 9 **September, 1955**

Editor — G. H. Cale
Associate Editors — M. G. Dadant, Roy A. Grout
Managing Editor — Adelaide Larson

Published monthly at Hamilton, Illinois. Entered as second-class matter at the Post Office, Hamilton, Illinois. In the United States, Canada and Mexico, $2.00 a year; two years $3.50; three years $5.00. Foreign $2.50 a year; two years $4.50; three years $6.50. Subscription stopped at expiration date printed on wrapper. Available on microfilm at moderate prices by writing to University Microfilms, Ann Arbor, Michigan.

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Comments

TEXAS—The article in July on plastic equipment for comb honey is quite interesting. The whole thing sounds very promising and I am going to give it a try. It seems to me that the equipment manufacturers are staring opportunity in the face. Someone should get on the ball and develop this field. I feel that the role of plastics in bee equipment could be tremendous.—Frank W. Sullivan, Dallas.

NEW HAMPSHIRE—In support of Dr. Jarvis, I relate one of the many benefits I have derived from the continuous use of honey. Beginning the night of June 15, 1953, for 17 nights I slept very little or not at all. A doctor prescribed sleeping pills. For the first 11 nights they served their purpose but on the 12th the remaining 4 capsules did not produce sleep. The following two months showed no signs that such medicine regulated my sleep and bedtime was more of a torture than a rest period. Many times I had heard that honey was good for another ailment I had and several times I bought honey in local stores but it never was effective. One day, away from home, I saw jars of honey in a store different from the kind I was accustomed to buying, so I bought several jars and began to use it. The first spoonful set me on the road to better health. The first benefit was noted after seven days (I had then consumed about 5 lbs). About 6:45 that evening I was listening to the radio, waiting for the broadcast of a ball game. I left the radio on and laid down. I never heard that game and it was 10:15 the next morning when I shut the radio off. This result was not due to the sleeping pills nor to liquor because I have yet to take the first sip. For the past year I have been praising honey in my community to sick people whose hope of recovery had been given up and I have certainly gathered a lot of interesting data about the effect of honey on health.—Don A. Boulay, Berlin.

NEBRASKA—I started spring with 20 colonies, some sirup fed for a long time as it was very dry and they were short of stores early. When the clover bloomed we had about a week of wet, cold weather, so it was really a swarming year. I aimed to build to 30 colonies but went right on by and how! I had nine acres of clover for seed and a neighbor less than a mile away had a large field he left for seed. Others within two miles plowed theirs under late. Harvests came early. Alfalfa bloomed over a long period. I had 19 acres I cut in patches so some of it was in bloom for the bees over a long time. Last year I had 25 colonies and got a 45 pound average. This year, lots of nice comb honey and extracted honey. Tax figures list only 232 hives in the county, not many for 24 square miles.—Charles E. Herzog, Sutton.

MICHIGAN—Had a queer experience. I was hospitalized (under surgery) and had a man look after my bees. He did everything wrong. I was ill four months and for the first time in 12 years did not get a drop of honey. But I had four swarms that hived themselves in a pile of extra supers. Started with two colonies; now have five and hope I will be well enough to care for them. I am 67 years old and always did care for them. They are my pets.—Mrs. Anna Downs, Wallace.

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Chevalier Alphandery . . .

The Official Journal for France announces that Mr. Raoul Alphandery, well known in French beekeeping circles, has been made a chevalier (knight) in the French Legion of Honor for his meritorious work. More glory to him.

Importations . . .

Owing to a short crop in France the Minister of Agriculture has approved of importations of honey; 500 tons from the United States, 125 from Mexico, 175 from Hungary, and 50 tons from Jugo-Slavia. It is not anticipated that such importations will affect the price of domestic honey, since imports are high in price.

Revue Francaise d'Apiculture

Carniola

Janscha's Apiary . . .

British Bee Journal reports the house of Anton Janscha and its accompanying bee house still stands in the Carniolan country after more than 220 years from the time of Janscha's writings on bees. The bee house is not in bad repair and possibly some of the hives still used date from Janscha's time.

England

Bee Research Annual Report . . .

The sixth annual report of the Bee Research Association has just been received. We sometimes assume that the only work of this association is the publication of the "Bee World," International monthly on bees. However, members of the association with much effort to themselves, also gather and conduct a large library on beekeeping subjects, make valuable translations from other languages, compile bibliographies, have assembled a national museum of beekeeping objects, a pictorial library and strive in other manners conducive to the forward look in the beekeeping industry.

Accompanying the report is a 36 page "Beekeeping Research Digest," a comprehensive compilation of worthwhile work done in beekeeping investigation during the year. We recommend sending one dollar to Bee Research Association at 2 Northover, Bromley, Kent, England for a copy of the report and the digest.

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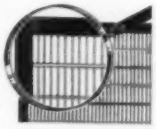

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Wintering Bees in Northern Saskatchewan

by J. E. Hastings

The author standing by a tall one.

I HAVE never seen an article about wintering bees in the northern fringe of the agricultural section of our country. I refer particularly to northern Saskatchewan. I live less than 30 miles from the northern border of cultivated soil in this part of the province, so climatic conditions are vastly different from those of beekeepers who winter bees in the United States.

Great temperature differences can be expected in a twelve month period. During severe winters, cold spells from 20 degrees below zero to 60 below lasting several weeks can be anticipated. This in addition to a possibility of only six or seven hours of daylight and a weak, anemic sun with practically no heat, tests the endurance of the colonies to the limit. Seldom do we get a clearance flight from mid-October until the latter half of March.

The winters in the past few seasons have shown a tendency to moderate. Low temperatures still occur but with less frequency and the cold periods are of shorter length, being punctuated with milder spells, the mercury rising to the low 20's above zero occasionally.

Having had several years' experience wintering outside in this climate, it is only natural to expect to profit through the knowledge gained by various mistakes and experiments I have made. Also where the three main races and hybrids between them have been tried, clear cut advantages and disadvantages are evident. Even within one race a certain strain may transmit traits desirable or detrimental to satisfactory wintering. It is interesting to note for instance how one strain will use consistently less feed in winter and as a rule this is linked with strains that are quiet and never in a hurry for early clearance flight. Other strains may show restlessness for the entire winter so they use more stores and have more dysentery. When these factors are observed often the blame is laid on inferior feed but this is not always so.

For several years the three common races were wintered in my apiary. Invariably the dark races (Caucasian and Carniolan) gave better results than Italian although some Italians did show considerable hardiness. Hybrids between the dark and the yellow races showed greater difference in results, just as they do in production. The purer the race, the more uniform results are to be expected in production or wintering as well as temperament. I finally chose the Mountain Grey Caucasian as the best all around bee for this climate. Apparently they developed for a climate similar to ours. Toward the end of the honeyflow they concentrate on storing enough honey and pollen in the first and second brood chambers for winter needs. Italian colonies, on the other hand, will be found with little if any surplus in these bodies. Caucasians are able to fly at lower temperatures also and so they obtain clearance flights which might otherwise be missed. They definitely winter on less stores.

For wintering in the north, one full super of the finest white honey is an absolute necessity for each colony. The colony may not use all of it but no one likes to be forced to draw the last dollar from his bank account. Any surplus is not wasted and abundance may mean the difference between death and survival in a backward spring.

The finest white honey; let me emphasize this. When bees can expect no flight for several months, the best feed is poor enough to slow up the accumulation of waste material within the bees' bodies. Honey of this quality granulates slowly and is seldom of a hard consistency, so the bees can obtain their requirements with greater ease, particularly when they cannot secure water to soften their stores.

Pollen, of course, should be included. An examination of the lower brood chambers should reveal several combs heavy with pollen. Even in a severe climate like ours, brood rearing may begin in February long before natural pollen is available. So supplies must be on hand to assure gains in colony strength in early spring.

Colony strength for wintering should not be measured in the number of bees alone but by the number of young bees reared from mid-August on. A colony bursting at the seams with bees in October may be a complete flop for wintering. Possibly the old queen was superseded in early August and, in an early, cold fall, the new queen will have raised few bees to carry the colony until spring.

It has been my practice to unite mating nuclei at the end of queen rearing each fall for wintering purposes. These, besides the young queen, may contain as little as four combs, and not over eight combs, of bees. These colonies consist of possibly 90 per cent young bees from late emergence that have done little if any field work. After being given a super of honey, they are packed for winter just like full strength colonies. Seldom is loss encountered and their feed consumption is low. By unpacking time, around May 15, they are equal to regular colonies; sometimes better. In my opinion these nuclei colonies are actually stronger in the fall than many of the other colonies.

Old bees in a colony in winter are a hazard. They are restless, consume more honey and create excessive heat. If the top entrance remains open, they may not do too much damage. However, in a cli-

mate like this, the top entrance may be closed and thickly crusted with hoarfrost from escaping moisture for long periods. These old bees then cannot escape to fly and so perish. In their attempts to locate an entrance they cause considerable disturbance to the colony through their restlessness which may cause a rise in temperature, premature brood rearing and later dysentery.

A desirable site for a winter yard should be on high ground affording good drainage. Protection from wind should be provided on the north, west and east sides. The best protection is a margin of trees dense enough to allow little or no wind to strike the colonies. A site protected on all four sides and yet allowing full sunlight is ideal.

Bees are wintered in double brood chambers. The lower one should contain some feed with a good supply of pollen; the upper at least 50 or 60 pounds of fine, well ripened honey.

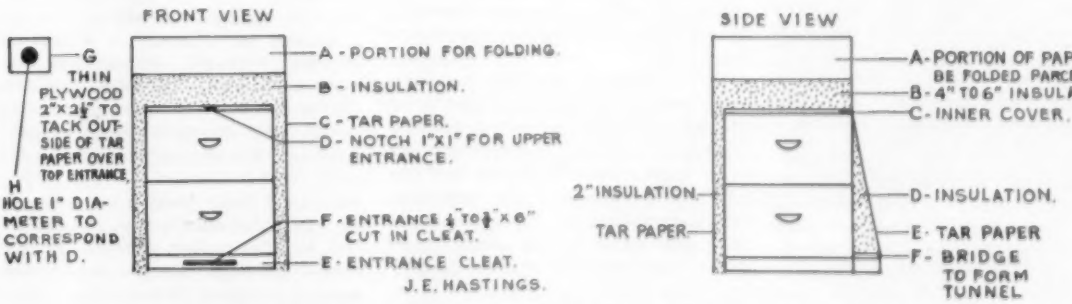
Both lower and upper entrances are provided. The best lower entrance I have used is a slot six inches long by three-eighths of an inch high cut in the entrance cleat. This narrow slot keeps out mice but provides enough entrance for early spring flight. For an upper entrance I prefer one about an inch square accomplished by boring a hole as near as possible to the top of the food chamber on the south or front end. Two years ago I found a better way. An inner cover is made from ⅜ inch lumber with a one inch square edge stripping and at the front, a square notch of one inch by one inch is cut from the rim to allow the entrance. A four inch square is removed from the inner cover toward the front end and a double screen made of hardware cloth is used to cover this, one layer on either side. This allows the moisture to rise into the upper insulation, should the top entrance become clogged with frost or ice. Colonies so packed are always dry.

In protecting colonies for winter, both packing cases and tar paper wraps have been used. The wrap has been found highly satisfactory and I now use it entirely. I use two inches of planer shavings or dry chaff and straw on the back and sides. On the front the packing should taper from two inches at the bottom to nearly nothing at the top. Tack the tar paper against the upper hive body just below the entrance. With light packing more of the heat of the sun is absorbed through the tar paper to the benefit of the colonies.

Six inches of insulation are put on top of the inner cover and the four corners of the tar paper wrap are simply folded parcel post wise over the packing and secured in place with nails forced through the folds and then forced back again as would be done with pins in joining cloth. This allows a four to six inch square opening to help excessive moisture on top to escape. The hive cover is placed over this and secured with a brick or twine tied from the twine which encircles the hive and tar paper, up over the cover and down to secure it on the other side.

Another idea of mine, to secure the tar paper to the hive body and to control the upper entrance, is to use a piece of thin board (plywood preferred because of its durability) two inches by two and one-half inches. As near one end as possible bore an inch hole. When you come to securing the tar paper for the top entrance, place this board so the hole in it and the one on the cover correspond, with the long end down. Drive one or two small nails through the lower end, securely into the super. If placed properly this will eliminate any possibility of the upper insulation dropping down and clogging the entrance. Take your knife and puncture the tar paper so the bees can enlarge the opening as they will. Sometimes when warm unseasonable weather continues for the first part of winter, bees will chew out the entire inch hole for

In the early winter of 1953, before the deep snow; all tested Caucasians that came through 100 per cent.


FRONT VIEW
G
THIN PLYWOOD 2"X2½" TO TACK OUTSIDE OF TAR PAPER OVER TOP ENTRANCE.
H
HOLE 1" DIAMETER TO CORRESPOND WITH D.
A - PORTION FOR FOLDING.
B - INSULATION.
C - TAR PAPER.
D - NOTCH 1"X1" FOR UPPER ENTRANCE.
F - ENTRANCE ¼" TO ⅜" X 6" CUT IN CLEAT.
E - ENTRANCE CLEAT.
J.E. HASTINGS.
SIDE VIEW
A - PORTION OF PAPER TO BE FOLDED PARCEL-WISE.
B - 4" TO 6" INSULATION.
C - INNER COVER.
2" INSULATION.
TAR PAPER
D - INSULATION.
E - TAR PAPER
F - BRIDGE TO FORM TUNNEL

Working drawing showing front and side views of Hastings' plan of packing.

ventilation. When cold weather returns it is a simple matter to take a small scrap of tar paper, slide it in between the block and the entrance from the top to reduce it to whatever size opening may be desired.

If the block and inner cover are correctly placed, no difficulty will be experienced in sliding the tar paper into place and yet it will be firm enough to remain in position. If the block is nailed at the bottom only this permits removal of the inner cover for early inspection without pulling nails and disturbing the arrangement.

A periodic inspection of the colonies in winter and early spring is desirable. Much can be understood of their conditions by placing an ear at the upper entrance and "listening in." If there is barely an audible hum with a peaceful sound, you are reasonably safe in saying all is well. During cold weather the upper entrance should be crusted with frost. Should an open, damp condition exist you will hear an excited hum and bees may be seen running around the entrance, some attempting to fly only to perish in the snow. This spells trouble, either from too many old bees, faulty feed, dysentery or even a dead queen. There is nothing to be done but to hope for an early warm spell to allow flight and inspection. These colonies may die or survive in a weakened condition.

I am a firm believer in checking bees as early as possible in the spring. Many a colony has been rescued that otherwise would have been lost. If the beekeeper is experienced very little disturbance is necessary and they may be worked quite rapidly. The first day the temperature reaches a point where bees are flying freely (from mid-March on here) remove the upper insulation enough to prevent any of the material dropping inside the hive. Lift the inner cover and you should be able to see what the strength of the colony is and what the feed supply is. A super with combs of honey should be at hand to enable you to remove empty, unoccupied combs, should the colony be low in feed, replacing with honey that you have brought.

Some colonies may be of fair strength and yet appear scattered and listless with a cry of distress. Better check such a one as it may be queenless or have a poor queen. Lift out a few of the central combs where most of the bees are and check for brood or eggs. Also, while the combs are out, look down into the top of the lower brood chamber to see if there is any sign of a brood nest down there. If no brood is in evidence, unite these bees to a queenright colony as soon as you can. I often winter over a few two or three comb nucs, two to a hive in a partitioned hive body, for just such an emergency.

Do not keep any colony open longer than necessary because you might chill the brood. Remember brood at this time is beyond value. An experienced beekeeper can just about read the whole story in a quick look.

Packing should be left on until around May 10 to 15. These are the dates divisions are taken from overwintered colonies so the whole operation can be done at one time. Queens for the divisions are, of course, secured from southern breeders.

The value of any wintering program is measured by results. As we gain experience, we see where we can better ourselves by making changes in our practice. In past years, losses as high as 10 per cent were suffered. Now losses have been cut to where no colonies have been lost in the past three years.

Saskatchewan

Autumn Feeding

by Ronald Ribbands*

AUTUMN feeding of honeybee colonies enables the beekeeper to take a substantial additional amount of honey from his hives, and to replace it with stores derived from the sugar which is fed. The details of this practice have often been a matter of controversy; I will try to review the facts which have been established by experiment.

The kind of feeder used is a matter of convenience. I know of no evidence that slow feeding is more advantageous to the bees than rapid feeding, or vice versa (my own preference is for the simplicity and economy of the inverted 7 or 14 lb. honey-can).

Syrup Concentration

The results of the experiments of Weippl, Gooderham and myself, carried out in different countries and conditions, agree in emphasizing that more stores are produced if the sugar syrup is fed in concentrated solution. From my experiments (published in Bee World, October 1950) I calculated that each pound of excess water which the bees had to eliminate involved the loss of 4 to 5 oz. sugar.

For practical purposes the relevant question is whether sugar syrup should be supplied at 66⅔% concentration or at some lower concentration; higher concentrations are impracticable because the solutions are supersaturated and the syrup will granulate in the feeder. At 66⅔% concentration sucrose is fully saturated at 17°C. (62° F.), so there is a risk of some granulation at this concentration. However, at 64% concentration the temperature can be lowered to freezing-point without such risk, and so this concentration can be safely recommended. It can be obtained by using a solution of 20 lbs. sugar in 9 pints of water.

My experiments revealed that concentrated syrup stimulated brood rearing, so that colonies fed with concentrated syrup produced more brood as well as more stores than colonies fed with the same amount of sugar dissolved in dilute syrup. Yet another advantage of concentrated syrup was demonstrated by James Simpson (Bee World, July 1952), who found that the water content of stores produced from concentrated syrup might be up to 3% less than that of those produced from dilute syrup.

These results, added together, show that for autumn feeding concentrated syrup is better than dilute syrup in every respect.

Time of Feeding

In my experiments, four sets of colonies were fed during the last week of August, and four more sets during the third week of September. About 10% more stores were produced by the groups which were fed after mid-September — this difference may have been a consequence of greater stimulation of brood rearing by the earlier supplies, or the earlier feedings may have inhibited normal foraging to a greater extent than the later ones; there is no evi-

* Author of "The Behavior and Social Life of Honeybees."

dence for either of these alternative explanations.

This evidence suggests that late feeding is desirable; the exact date may be a matter of convenience, the final deadline depending on the season and the condition of the colony. Colin Butler's experiments (Annals of Applied Biology, 1946 p. 307) provided solid evidence that winter feeding with candy, or spring feeding with sugar syrup, is not a satisfactory alternative to autumn feeding.

Amount of Stores

In my experiments either 24 or 30 lbs. sugar was fed to each colony, and in those circumstances when concentrated syrup was fed in mid-September 92% or more of the sugar was stored, so that more than 11 lb. stores were produced from each 10 lbs. sugar which was fed. It could happen that when smaller quantities of sugar are fed the proportion diverted to brood rearing or to excitement is greater, but there is no evidence on this point.

Quality of the Stores

More curious views have been expressed about the quality of the stores produced by autumn feeding than about any other aspect of this problem, possibly because so many beekeepers are loath to believe that any substitute can be as good—even for bees—as real honey.

Simpson found that the water content of sugar-syrup stores is similar to that of flower honey, and that the most important difference between the two is in respect of their sucrose content. Whereas, domestic sugar is 100% sucrose, often only about 50% of the sugars in nectar are sucrose, the rest being glucose and fructose. Browne analyzed 92 samples of flower honey, which had a mean sucrose content of only 1.9%, whereas Simpson's analyses of sugar-syrup stores revealed a sucrose content of 15-25%. In both kinds of stores the sucrose content is markedly less than in the raw material from which the stores were derived, and the reduction is due to splitting, with invertase from the salivary glands of the honeybee, of sucrose molecules into molecules of glucose and fructose. Simpson's analyses show that most of the splitting occurs during processing of the stores, before they are sealed.

The difference in sucrose content between honey and syrup stores is a fact, and the high sucrose content of syrup stores is the most important advantage which they possess in relation to honey stores. Their sucrose - glucose - fructose mixture is more soluble than the glucose-fructose mixture, with only a very small sucrose content, which occurs in honey. Therefore, syrup stores can granulate in the comb to only a very limited extent, as Sechrist has pointed out (Gleanings in Bee Culture, 1925, p. 53). Experimentally Simpson has made various mixtures of honey and sucrose, which demonstrate the correctness of this view.

When honey granulates coarsely the bees may throw the larger crystals out of the hive. Moreover, they consume the surrounding liquid, the water content of which is higher than that of the original honey, and is liable to cause dysentery in times of long confinement to the hive (Alfonsus, Journal of Economic Entomology, 1935, p. 568). Hence non-granulated stores are advantageous.

These results leave no doubt that the physical characteristics of sugar-syrup stores are more favorable than those of honey. But what of its food value? E. F. Phillips found (Gleanings in Bee Culture, 1924, p. 76) that adult bees kept in cages live as long on sucrose as on honey, and there is no known difference between their food value. The known food value of honey is entirely a matter of its sugar content; Kitzes and his co-workers (Journal of Nutrition, 1943, p. 241) showed that honey contained only traces of vitamins, and that even these traces were probably in suspended pollen grains—pollen is very rich in vitamins.

A contrary conclusion might be derived from the work of Butler (Annals of Applied Biology, 1946, p. 307), who found that colonies overwintered with syrup only did not produce as much brood as colonies overwintered with honey only, or honey and syrup. The great influence of protein supplies on brood rearing is well established; in Butler's experiments all the colonies were said to have "an abundant supply of natural pollen," but no precautions were taken to ensure that the colonies were equally supplied with pollen. In my opinion the most likely explanation of his results is that the difference was due to pollen below the capped honey stores, and I would be surprised if a properly controlled experiment—both sets of colonies put on empty combs, autumn-fed with either honey or syrup supplied by feeder — would reveal any difference.

Conclusions

In conclusion, good syrup stores are much better for the bees than bad honey, and there is no evidence that good honey is any better than well-stored syrup which covers up a similar quantity of stored pollen. Concentrated syrup should be supplied, and 20 lbs. sugar/9 pints water is the maximum concentration which can be used without risk of granulation in the feeder. If this syrup is supplied in quantity at the end of the season 11 lb. stores can be expected from each 10 lbs. sugar used.

Rothamsted Experimental Station, England.

Apologies . . .

In our Editorial last month announcing the new check-off plan set up by the National Honey Packers and Dealers Association, with a list of cooperating firms, the names of these six were inadvertently omitted (apologies, please): Jack Gomperts & Co.; R. W. Barnes & Son; L. D. Taylor; Hudson Tea & Spice Co.; Kane Import Co.; A. I. Root Co. of Syracuse.

Iowa Report . . .

After considerable delay, the 1954 issue of the State Apiarist Report is available for distribution. This publication is available upon request to F. B. Paddock, Extension Apiarist, Iowa State College, Ames, Iowa.

Milum Heads Department . . .

Our genial and helpful friend, Dr. V. G. Milum, of the University of Illinois, has been made Acting Head of the Department of Entomology. If that word "acting" is later omitted the beekeepers of Illinois will throw a celebration.

Bee-Collected Pollen for Artificial Pollination of Apples[1]

by Carl Johansen[2]

Historical Review

ARTIFICIAL pollination of apples is profitable in Washington under certain conditions according to Overly and Overholser (1937). These conditions are:

(1) When Winesap or Delicious varieties of apple are planted in solid blocks.

(2) When insect pollinator activity is poor or inadequate because of inclement weather during the blooming period.

Use of this cultural technique has developed to commercial proportions, the amount of pollen used in a given season being dependent on weather conditions.

A number of devices have been used for obtaining bee-collected pollen and using bees to distribute hand-collected pollen (Kremer, 1948; Burrell, 1931; King and Burrell, 1932). Distributing trays for honeybee dispersion of hand-collected pollen have not been satisfactory and may actually hinder pollination by interfering with normal bee activity (Snyder and Bullock, 1946; Bullock, 1947). Sprayer, airplane or bomb applications of hand-collected pollen have not been satisfactory either (Overley and Bullock, 1947; Blasberg, 1951). At the present, commercial-scale artificial pollination is with hand-collected pollen usually applied by hand with a No. 4 pig-hair brush (Snyder, 1947).

A number of diluents for the formulation of pollen were tested by MacDaniels (1930). He obtained best results with lycopodium. Bullock and Overley (1949) tested 37 diluents and found that lycopodium, non-fat powdered milk, and egg albumin were best. It has been observed that boron may increase the germination of pollen material (Thompson and Batjer, 1950; Antles, 1953).

Viability and Storage of Bee-Collected Pollen

Hand-collected pollen has yielded the most satisfactory material for artificial pollination of apples because it retains its viability longer than bee-collected pollen (Vansell and Griggs, 1952). Singh and Boynton (1949) found that hand-collected pollen samples retained high viability for up to 9 days at room temperature, whereas bee-collected pollen lost 62% of its viability within 5 hours. Kremer (1949) held bee-collected pellets in open jars at 45° F. The viability of this material was reduced to 5% after 60 days under these conditions.

Griggs et al (1950) found that pellets stored in an 8.6° F. deep freeze unit and packed in dry ice to maintain 59.8° F. gave 83% germination after seven months. Later Griggs et al (1953a and 1953b) developed a method of storing bee-collected pollen in a deep freeze unit at about 0° F. Bee-collected pollen which gave 85% germination near the time of collection gave 34% after 12 months under this type of storage.

Since it is known that large quantities of pollen can be more cheaply obtained by means of bee-collection than by hand-collection, the cold storage techniques developed by Griggs et al offered promise. If bee-collected pollen could be stored without serious loss of viability and later formulated as dry dusts for application in orchards as needed, artificial pollination would be a more economical and useful technique than it is at present. The first objective of the present study was to test the viability of bee-collected apple pollen under various conditions in cold storage. Later studies will be aimed at formulation of the pollen material as a dry dust and its application to apple trees.

Methods and Materials

Three hives of honey bees with pollen traps similar to the type portrayed by Schaefer and Farrar (1946) were placed in apple orchards at the peak of the blooming periods. Using the technique outlined by Griggs et al (1953a and 1953b), pollen samples were removed from the traps at 30-minute and 60-minute intervals and immediately placed in an insulated box containing dry ice. Later, these samples were stored in a cold storage unit at 0° F. A number of treatments of the pollen in cold storage were set up, i.e. dessicator, vacuum dessicator, etc.

Again, using the techniques of Griggs et al (1949, 1953a and 1953b), germination tests of the stored pollen were conducted on a periodic basis. Pellets were mixed with a small amount of 15% sugar syrup and plated on freshly-prepared 15% sugar plus 2% agar medium. The petri plates were held at 75° F. Germination was checked after 24 hours.

Field Observations

Betts (1935) and others have shown that honey bees tend to collect pollen from one kind of plant at a time. It has also been determined by Ribbands (1949) and others that honey bees prefer to forage certain crops for various reasons. The investigations conducted at Wawawai, Washington, were affected by these honeybee foraging characteristics. Three hives were placed in an orchard of about 400 apple trees, mostly of the Lodi variety. There were not many blooms in this orchard and the bees collected pollen from balsam-root **(Balsamorhiza sagittata)** on a distant hillside. They foraged the apple blooms for nectar only.

Later, the same hives were placed in a large orchard of Rome Beauty apples at Dayton. In this case only pure apple pollen was collected until 10:30 a. m. on the third day. At this time a few pellets of mustard **(Brassica campestris)** and dandelion **(Taraxacum officinale)** started appearing in the traps. The conditions at Dayton were nearly perfect, with large orchards of Rome Beauties in full bloom and no blooms in the cover crop.

1. Grateful acknowledgment is due I. E. Wilson, Wawawai, and L. F. Dumas, Dayton, for the use of their orchards; R. R. Legault, Department of Agricultural Chemistry, State College of Washington, for suggestions and use of facilities; and L. R. Bryant and W. B. Ackley, Department of Horticulture, State College of Washington, for suggestions and information, on this project.

2. Assistant Entomologist, State College of Washington, Pullman. Scientific Paper No. 1399, Washington Agricultural Experiment Stations, Pullman. Project 860.

Table 1 shows the variation in hourly pellet collections in the Dayton orchard and an orchard at Pullman. The data indicated are in agreement with Vansell and Todd (1948) who stated that pollen income was greatest between 9 a.m. and 2 p.m.

Table 1. Average Number Bee-Collected Pollen Pellets Obtained in Traps at Hourly Intervals, 1954.

Location	Date	A.M.					P.M.				
		7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
Dayton	5-12-54	15	108	381	499	485	205	178	158	112	42
Pullman	5-20-54	71	84	416	248	395	250	94	20	16	6

The efficiency of the pollen traps was checked by counting the number of pollen-gatherers entering a hive and the number of pellets obtained in the trap in an hour. About 20% of the pellets were scraped into the traps.

Results of Germination Tests

As a check on various storage treatments, bee-collected and hand-collected pollen samples were held at room temperature and tested for viability at intervals. The results of these tests are presented in Table 2.

Table 2. Viability of Bee-Collected and Hand-Collected Pollen at Room Temperature (75° F.), Pullman, Washington, 1954.

Sample	% Germination			
	initial	1 day	3 days	5-days
Bee-collected pollen	78	11	0.4	0
Hand-collected pollen (cured at 75° F. for 72 hrs.)	89	47	19.4	0

Pollen samples stored under various conditions gave the germination test results listed in Table 3.

Table 3. Viability of Bee-Collected and Hand-Collected Pollen under Various Storage Conditions, Pullman, Washington, 1954-55.

Sample	Treatment	% Germination (No. Months in storage). initial	1	3	5	7	9
Bee-collected (30-minute collections)	open in 0°F	78	68	62	58	48	46
Bee-collected (30-minute collections)	dessicator in 0°F	78	72	64	58	50	32
Bee-collected (30-minute collections)	vacuum dessicator in 0°F	78	64	65	52	38	23
Bee-collected (30-minute collections)	lyophilized dessicator 0°F	78	62	38	24	11	6
Bee-collected (30-minute collections)	lyophilized, dessicator in 75°F	78	13	2	0.6	0	0
Bee-collected (60-minute collections)	open in 0°F	78	52	56	52	42	39
Bee-collected (60-minute collections)	dessicator in 0°F	78	63	53	54	38	28
Bee-collected (60-mintue collections)	vacuum dessicator in 0°F	78	51	53	53	30	17
Hand-collected	open in 0°F	89	92	87	79	75	71
Hand-collected	dessicator in 0°F	89	88	86	77	76	69

Conclusions

Using the techniques of Griggs et al (1953a and 1953b), bee-collected pollen pellets stored at 0° F. maintained up to 46% viability for nine months. Hand-collected pollen maintained 71% viability under the same conditions. Lyophilization treatments were not satisfactory because of the loss of viability during treatment. The greater loss of viability of samples in dessicators or vacuum dessicators as compared with those open in 0° F. storage can probably be accounted for by the repeated room temperature exposures of the dessicators in removing samples for germination tests. Germination tests only varied from 4 to 7% between pellets collected at 30-minute and those collected at 60-minute intervals on the nine-month test date.

Conditions necessary for obtaining bee-collected apple pollen for artificial pollination are quite exacting. Large plantings of a suitable pollinizer variety without the presence of competing pollen plants are required. (Philp and Vansell, 1944, stated that Delicious, Gravenstein, McIntosh, and Northern Spy are self-barren; while Winesap and Stayman are interbarren; and Stayman and Gravenstein are unsatisfactory pollen producers.) Hives must be placed in the orchard at the peak of the blooming period.

Since bee-collected pollen can be obtained more cheaply and easily than hand-collected, this method may prove of practical importance to the fruit grower. The greatest remaining obstacle to using bee-collected pollen is the loss of viability which occurs during formulation of the pollen dust.

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Sulfa Again

by L. F. Childers

ON April 27th I received a letter from an extensive beekeeper saying he had just inspected one of his yards and found a heavy infestation of American foulbrood. He said there were only one or two dozen cells per colony which made him suspect local robbing. He further stated that these colonies were short of stores; that they had no disease last summer and showed none when packed away last fall. He at once began feeding sulfa and terramycin.

He asked for my comments and advice on the proper precedure for elimination. I told him to feed treated sirup clear up to the nectar flow and encourage his bees to clean out every cell of old honey in the hive, even starve them to make them do it. Commenting, I told him his case was not at all hopeless; that success is best achieved when the bees are treated between nectar flows or when nectar is not coming in, the idea being to get sulfa into **every bee, since there is no doubt that the adult bee is the carrier of this disease.**

The theory we have labored under for the last fifty years is that the bees, in cutting down the dried scales, have gotten spores on their feet or in their mouths and have carried them about, getting some into the honey and feeding spores to the young in their food. There is nothing wrong with this theory but I think the following one more nearly fits the case.

To get the matter clear let us get some facts before us. Katznelson has proven that sulfa will not kill the spores of American foulbrood; that these spores will germinate in water but will not live; that they will germinate, but not survive, in media that other organisms will develop in; but, in media containing the dilute sugars of honey, they will thrive in profusion. He states further that the family of sulfa drugs are known to the profession as inhibitors of growth rather than killers of bacterial organisms. Now, how does

Childers kneeling by his mower for cutting grass in bee yard. In this article he presents a new conception of disease transmission and treatment.

that fit in with the problem of infection?

Since bees cut down dried scales with their mouth parts wouldn't you think the chances are a thousand to one that at least one spore would get into their stomachs? And, since the honey the bee lives on is more or less diluted in the stomach, this spore would certainly have a chance to germinate there and start vegetating. If so, then when such a bee goes afield and returns with its load of nectar and starts pumping it into a cell, some of these vegetating cells of the disease could easily get pumped in too. With a hive temperature of ninety degrees and in media of its choice what is there to hinder it from continuing to vegetate until the nectar, by evaporation, becomes too dense for cell division? Then there would be a cell of honey infected, not by a spore that would have to go through the process of germinating, but by a cluster of vegetating cells that would begin acting, on a moment's notice, on the next victim.

The action of sulfa then, since it won't kill the spore, is to kill or inhibit the development of these vegetating cells. It certainly does do something right there, but who cares what so long as it breaks this vicious chain of continuous infection. The problem then is to get a feeding of sulfa or terramycin into each adult bee and to be sure that all old or other infected honey is removed or eaten out of the combs.

As to burning, I would advise not to remove the diseased colony until it has been fed sulfa because some bees are sure to be left behind and they are likely to go into neighboring hives with their infection. Bees will clean out combs with disease with impunity while taking sulfa but why take the risk? Big operators can't afford the time it takes. Better melt down or burn.

Don't blame the sulfa for failure. It's just a tool. The failure occurs in the use of it.

Crop and Market . . .

Prevailing honey prices are good and, even though the crops in many areas are from fair to good, beekeepers may expect better than average prices for honey this season. However, it is up to the industry to continue and intensify its promotional effort. The Federation has increased its promotional budget. The State Marketing Committee Chairmen have been asked to contact their local chairmen early about publicity at fairs, radio stations, TV and local papers. In most cases this publicity can be obtained by careful planning by individuals and local associations. Every beekeeper should consider himself a part of the committee and volunteer his services for this campaign.

The Federation Marketing Committee is sending out 6000 copies of a sales plan to members of the food industry. It is sponsoring a Honey Display Photo Contest. Copies of last year's kit of helpful material are still available and a supplement with suitable radio, TV, and newspaper material will be published. The food industry is promoting a "Better Breakfast" campaign, a natural for honey. Every beekeeper should use this in his local advertising. Be sure to do your part!

S. Joaquin Watkins, Chairman
Marketing Committee
American Beekeeping Federation

Diabetic's Cookbook . . .

The Medical Arts Publishing Foundation, 1603 Oakdale St., Houston 4, Texas, announces a new cookbook, The Diabetic's Cookbook, to be published this fall. It contains 250 recipes for preparing beverages, pastries, desserts, fruits, meats, salads, sandwiches and vegetables. American Diabetic Association values are used. It is recommended by Dr. Charles H. Best, one of the discoverers of insulin. The author is Mrs. Clarice B. Strachan of Tulsa who developed the recipes over a period of 14 years during which she cooked for her diabetic son. The price of the book will be $6.50.

Bees of the Future

by G. H. Cale, Jr.

Dr. G. H. Cale, Jr. is the scientific head of the breeding project established by Dadant & Sons, at Hamilton, Illinois. Son of our Editor, he actually grew up among the bees and worked in commercial beekeeping with his father and in the apiaries of Dadant & Sons. In the second World War he served in a medical unit in India and, on return, assumed his present work. He attended Iowa State College in off season periods, finally obtaining his degree from the College in genetics under Dr. Gowen. His undergraduate studies were pursued at Carthage College, Carthage, Illinois, before his wartime service. Dr. Cale's concepts of genetical breeding of honey bees have led to the development of the present Starline stock now used by many beekeepers for superior honey production.

DURING the past year, it has been the writer's pleasure to visit a number of state beekeepers' meetings, and to participate in various discussions centering around the subject of bee breeding and its possible impact upon beekeeping. Essentially, the whole problem of bee breeding narrows down to a comparison between two systems of breeding—line-breeding and hybrid-breeding.

Unfortunately, quite a few articles have appeared in the various bee magazines, both recently and in years past, ascribing some particular merit to a system of bee breeding. All too often, these articles have borrowed their information from breeding work done on other animals and on plants, failing to take into account the mechanism of inheritance in the honey bee. We will attempt, in this article, to unscramble some of these past errors, taking into full consideration the knowledge of heredity as such, and of the honey bee in particular. An attempt will also be made to consider these problems in the full light of available information concerning so-called line-breeding methods in the bee.

It would be well to start with a definition of the word **hybrid** as applied to bees. Classically, a hybrid bee has been thought of in terms of a cross between various of the races —such as Caucasian times Italian, Carniolan times Caucasian, etc. Scientifically, however, a hybrid is defined as **the union of two or more individuals from pure lines that differ in their hereditary characteristics.**

The subject of this paper involves a good deal of discussion about the scientific hybrid, and must, of necessity, involve the terminology that has grown up with the science of genetics. This is a complex subject that has been made even more complex by the use of "six-bit" words that have a vague or unknown meaning to most of us. Fortunately, however, almost all the "six-bit" words may be reduced into every day language. While we may not be able to understand all of the details, still we may understand the mechanism of forming a scientific hybrid.

Our first task, then, is to define some of these words so that we may use them in a discussion of various methods of breeding bees. The first word hardly needs much definition—inheritance is certainly understood by all of us. The flowers in the field, our farm crops and animals, our honey bees, even ourselves, are all individual things representing a combination of inheritance from mother and father, and the environment in which they grew and developed. Inheritance is indeed universal! No living organism, from the lowest one-celled plant or animal, to the highest organism (man), is an exception to the laws of inheritance. It is true that some special cases of inheritance exist, i.e., a drone bee gains all of its inheritance from its mother—having no father—however, these special cases do not rule out inheritance, they simply modify our use of inheritance for the particular organism concerned.

Since inheritance is universal in all organisms, there must be some means, some vehicle, by which inheritance passes from father to son, from mother to son, from mother to daughter, and from father to daughter. The vehicle or carrier of inheritance is the chromosome. (This word is derived from two Latin words, **chromo** and **some**, meaning simply a color body. This usage was developed because the chromosome was receptive to a particular dye used to stain cellular tissue.) A chromosome may be thought of as a cylinder (see Fig. 1). These chromosomes

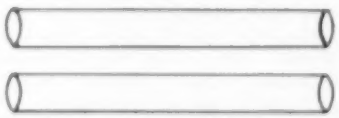


Fig. 1. Chromosomes may be thought of as closed cylinders. They occur in all cells in pairs, except in mature sex cells, where they occur as single strands.

vary in number from one species to another—man has 24, the honey bee has 16. They are found in pairs, therefore: man has 24 pairs of chromosomes, the honey bee has 16 pairs of chromosomes. Other organisms have chromosome pairs in varying numbers: from as low as one pair to as high as 200 pairs.

These vehicles, or carriers (chromosomes), are however, only the automobile in which the true hereditary units ride. Within each chromosome are a large number of

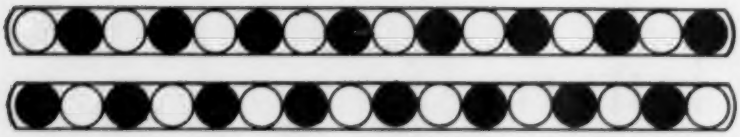


Fig. 2. Genes occur in opposite pairs in the paired chromosomes. Considering this chromosome pair from the standpoint of additive gene effects, and calling the "black" genes desirable, there are a total of 16 additive, desirable genes.

separate units which are called genes. (Fig. 2). These genes, probably complex chemical molecules, are separate units that guide the development of an organism and all the traits or characteristics that this organism may show. Genes act in certain, rather specified manners, not all of which are necessary to consider for our subject. We should, however, very briefly consider the more important of their actions.

We noted that chromosomes occurred in pairs and therefore realize that genes, also, occur in pairs—one in each of a chromosome pair (Fig. 2). In a particular pair of genes, one gene of the pair may dominate the other. In this case one gene is said to be dominant, the other recessive. At other times, neither gene is dominant and the effect is one of blending their characteristics. Just as if a white-flowered plant were crossed to a red-flowered plant and the progeny were all pink-flowered.

A fourth, and very important action of genes, is one of adding their characteristics for goodness or fitness in an organism. In Fig. 2, let us assume that the black genes are the necessary genes for a desirable character in bees, such as honey production. By adding the effects of the black genes we can count and see that there are 16 genes that can add their effects together for honey production. Our breeding effort, then, should be to concentrate as many of these additive types as possible into a particular queen and her worker progeny.

Let us now consider how all of this may affect bee breeding. First, we will consider the subject of line breeding. Essentially, all of the breeding of bees in the past has been some form of line breeding. Line breeding is a form of mild inbreeding, in as much as the breeding work is done within a particular stock or strain, with only occasional introduction of outside strains. Most line breeding is accomplished with known parentage for each generation, however in bees this is not and has not been true. At the very best, in honey bees, the only known parentage has been that of the queen mother, and in most cases even this line of descent can be traced for only a few generations.

We may consider that past breeding work in bees has been done within a group of bees that may be thought of as a closed population. Selection of any characteristic has been limited to the ranges of that characteristic that happened to be present in the population. Conscientious commercial breeders have made every attempt to select the very best in this population to carry on the next generation, and to rear queens for commercial sale. As breeders, they have been aware of the fact that some other stock, maintained by some other breeder, might improve their line of bees. Perhaps their own stock had a temper range from very cross, to a little crosser than average. Such a breeder might have realized that it was impossible to breed a more gentle bee within this population, so he quite properly seeks for some unrelated, outside stock that might be introduced into this closed population in the hopes of bringing in some of the genes that bring about good temper. Having achieved his result, this breeder might again maintain a closed population, until such time as it became necessary—either because of too close inbreeding, or because of lack of necessary genes—to again seek an outside source for genes not present in his population.

Any such semi-closed population is, however, in a constant state of change. This is partly because of differences in selection pressure and partly because of queens mating to unknown drones and thus losing, or bringing in, genes to the population. (See Figures 3 and 4).

Inheritance under a line breeding system is thus seen to be in a constant state of change—of reversals, of improvements. For very simply inherited characteristics, such as eye color in the honey bee, line breeding is just as effective as any other type of breeding. Body coloration in the honey bee is controlled by an estimated seven genes. Selection for

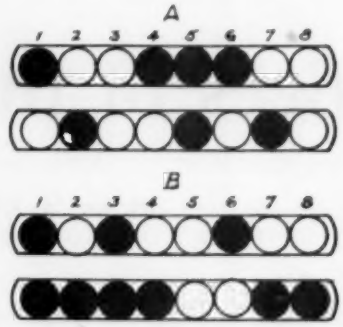


Fig. 3. Let us assume that genes at locations 1, 3, and 8 control temper, and that genes at positions 2, 4, 5, 6, and 7 control honey yield. Further assume that the black genes are desirable, and that the white genes are not desirable. We test stock A and find that it is quite productive (6 desirable genes), but that it is quite cross (5 undesirable genes). We test stock B and find it is not quite so good for honey production (4 desirable genes), but that it is quite gentle (5 desirable genes). Because the A strain is too cross, we select B for the next generation, and thus lose some of the desirable genes for yield.

Fig. 4. Drones, differing from queens and workers, have only one chromosome of each kind instead of a chromosome pair. If our selected line from Fig. 3 were to mis-mate to a drone such as this we would pick up three bad-temper genes at positions 1, 3, and 8. At positions 4, 6, and 7 we would pick up an additional three genes for poor yield. This is the result of an unknown mis-mating.

body color under a line breeding system is very possible. Many of our present commercial queen rearers have selected color quite well in their own stock and have been able to maintain a rather true-breeding population from the standpoint of color.

Whenever the genes controlling a characteristic are large in number, however, neither line breeding nor selection is effective as a breeding tool. Now this is a rather bold statement, and probably runs contrary to opinions that some may have. It is nevertheless a true statement for line-breeding in bees. A demonstration showing what happens to the chromosomes and the genes they carry may help to prove this point.

We have said that chromosomes, and the genes they carry, occur in pairs. Let us consider that type of gene action where the genes produce their effect by an additive manner,

so that the greater the number of desirable genes present, the more desirable the bee becomes. This would be the appropriate type of inheritance to consider for such characteristics as honey production. Any virgin queen receives one-half of her inheritance from her mother and one-half from the drone that was her father. Any one of the genes representing a pair in the mother may, however, be passed down to the daughter. Fig. 5 indicates what can

This segregation of the genes of the mother from one generation to the next means that it is impossible under a line-breeding system in bees to progeny-test—i.e., test the potential of a mother to pass good inheritance factors to her daughter. Uncontrolled matings, as already demonstrated, further complicate and hamper line-breeding.

Let us turn our attention now to hybrid bee breeding and see if these genes and chromosomes can show us

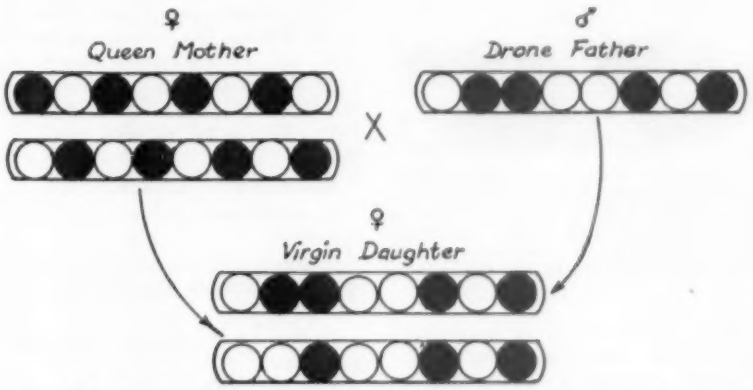


Fig. 5. A virgin daughter receives only one-half of her inheritance from her mother—this is a random sample half. In this case, the daughter could have received eight desirable genes (black) from her mother. Instead she received three. There is a 50-50 chance of receiving one or the other of each gene pair. Try it yourself using heads and tails on a coin. All sorts of daughters are possible.

happen in this case. We see that the daughter may be poorer than the mother, in spite of our selection. When we now consider the fact that the daughter may fly and mate at random with some unknown drone, we gain still further insight into the futility of line-breeding in bees (see Fig. 6).

why hybridization must supply the bees of the future. Line breeding was stated to be a form of mild inbreeding—hybrid breeding, on the other hand, is a form of intense inbreeding. By inbreeding, we mean mating closely related individuals together—i.e. parent-offspring (virgin mated to drones from her mother), sister-sister (virgin mated to drones from her sister), etc. Line-breeding employs natural mating, while hybrid breeding employs instrumental insemination and strict control of all parentage.

Under a line breeding system we indicated that we were breeding from what was thought to be the best in a relatively large, and fairly stable population. Hybrid breeding, on the other hand, means breeding from selected individuals to form inbred lines which may be thought of as very small, extremely uniform populations, each differing somewhat from other inbred lines in their inherited characteristics. (See Fig. 7).

Just as line breeding is quite effective for simply inherited characteristics, so also is inbreeding. The general effect of inbreeding for these simple inheritance traits is that they are "fixed" in the inbred line faster than by line-breeding. However, both systems are successful for such characteristics.

In hybrid breeding, however, we are able to breed for complex characteristics such as yield, temper, oviposition rate, with a degree of certainty that may not be achieved under line breeding. Here again is a statement that probably runs contrary to the thinking of others, and some amplification appears necessary. Figure 7 indicates that by inbreeding we have formed separate, small populations that are each constant in their hereditary factors (genes). Selection is made, therefore, not on the basis of an individual with mixed up hereditary characteristics, but rather on the basis of a line that has constant, and measurable hereditary characteristics. Poor, and indifferent lines, may be discarded. The better lines may then be crossed together to form a scientific hybrid, with each line in the cross supplying necessary "good" genes for valuable economic characters. These crosses may be repeated indefinitely, since the basic, inbred stock is maintained always as a pure line.

Since the inbred lines are uniform and unchanging, progeny testing becomes a distinct part of hybrid breeding. Various inbred lines are crossed together in various combination until a particular cross gives the sought for characteristics. This cross may then be repeated at any time in the future, giving comparable results. Indeed, under such a system, bees may even be bred for adaptability to small environmental

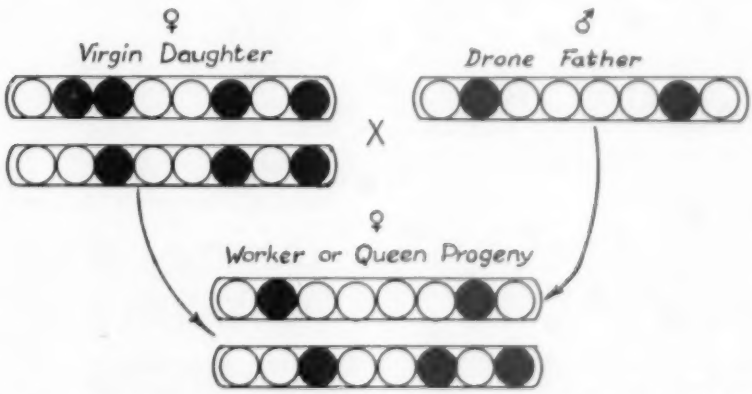


Fig. 6. Again the daughters—worker or queen—receive only one-half of their inheritance from their mother. A chance poor mating introduces only two good genes. The result is a gradual, and uncontrollable, deterioration of the stock.

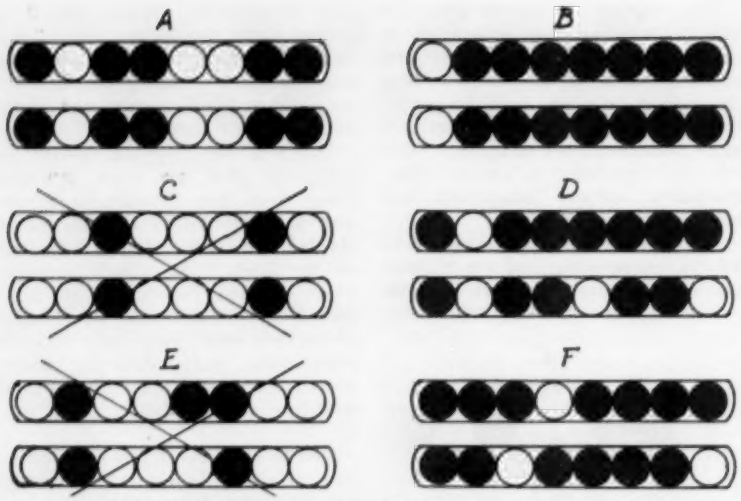


Fig. 7. Diagramatically represented here, are chromosome pairs from six inbred lines of honey bees. Lines C and E are poor inbred lines, and are discarded. Notice that the remaining lines, while carrying a few poor genes (white), are highly selected and uniform individuals. Individuals representing lines A, B, D, and F may be crossed together to form a four-way hybrid combination. This cross may be repeated indefinitely from the foundation stock of inbred lines.

regions. Such crosses further exhibit the condition known as hybrid vigor—an extreme condition of vigor associated with hybrids that gives them their "get-up-and-go."

Summary

Figure 8 attempts to clarify in one drawing the position of the two systems known as line-breeding and hybrid-breeding. Line-breeding is seen to be a system of breeding within a relatively large, semi-closed population. This population is constantly fluctuating and changing. Genes are introduced deliberately, in an attempt to incorporate some "good" trait; genes are introduced accidentally through mis-mating. At the same time, genes are "lost" from this population by changes in our selection pressures and because not all individuals in the population are allowed to have progeny. Line-breeding is, therefore, a grab bag! In a sense, we reach into this large population and pull out a handful of queens. We cannot pull out another handful with any assurance that they are going to be at all like the first ones.

Hybrid--breeding, on the other hand, is seen to be a system of forming small, uniform populations by intense inbreeding. Purified, and constant inbred lines are then evaluated and the poorer lines destroyed. Hybrid combinations may then be made among the remaining inbred lines. Such combinations may be repeated with confidence, even years in the future. Hybrid vigor gives us bees capable of greater crops of honey.

Hybridization therefore:

a) makes selection on a line basis effective.

b) introduces no unknown genes to the population through mismating.

c) each line supplies necessary good genes.

d) hybrid crosses may be repeated indefinitely.

e) makes progeny testing a reality.

f) makes adaptability breeding possible.

g) makes hybrid vigor a tool of the beekeeper.

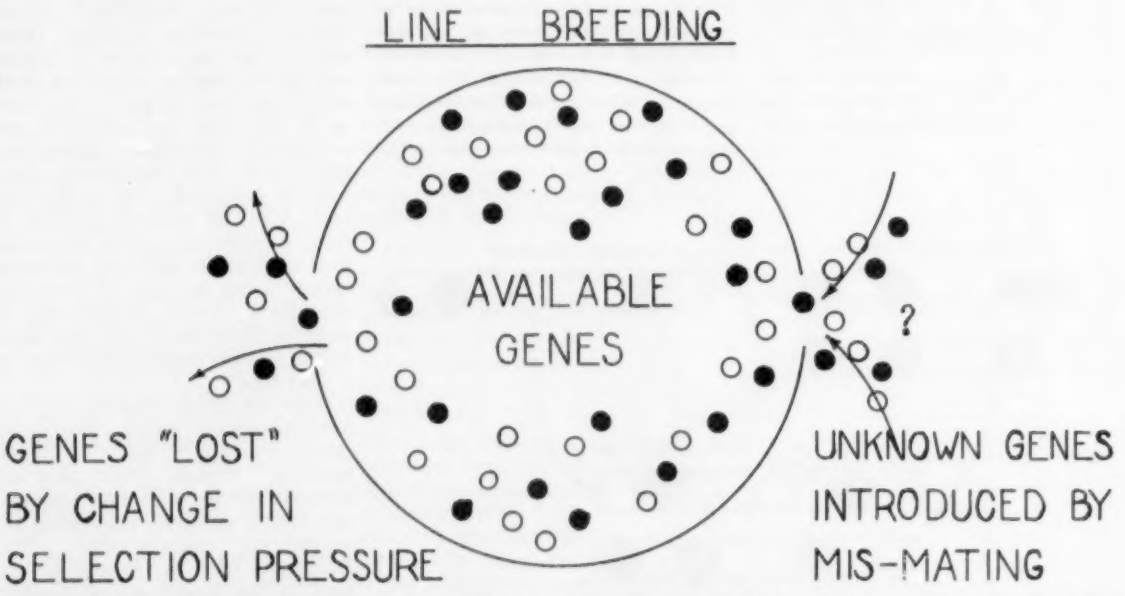


Fig. 8. Line breeding is seen to be a system of breeding under a constant condition of change of gene frequency. Unknown genes are introduced deliberately in an attempt to improve the stock, and accidentally by unknown mis-matings. Genes are lost to the population by change in selection pressure, and because not all the individuals in the population are allowed to have progeny.

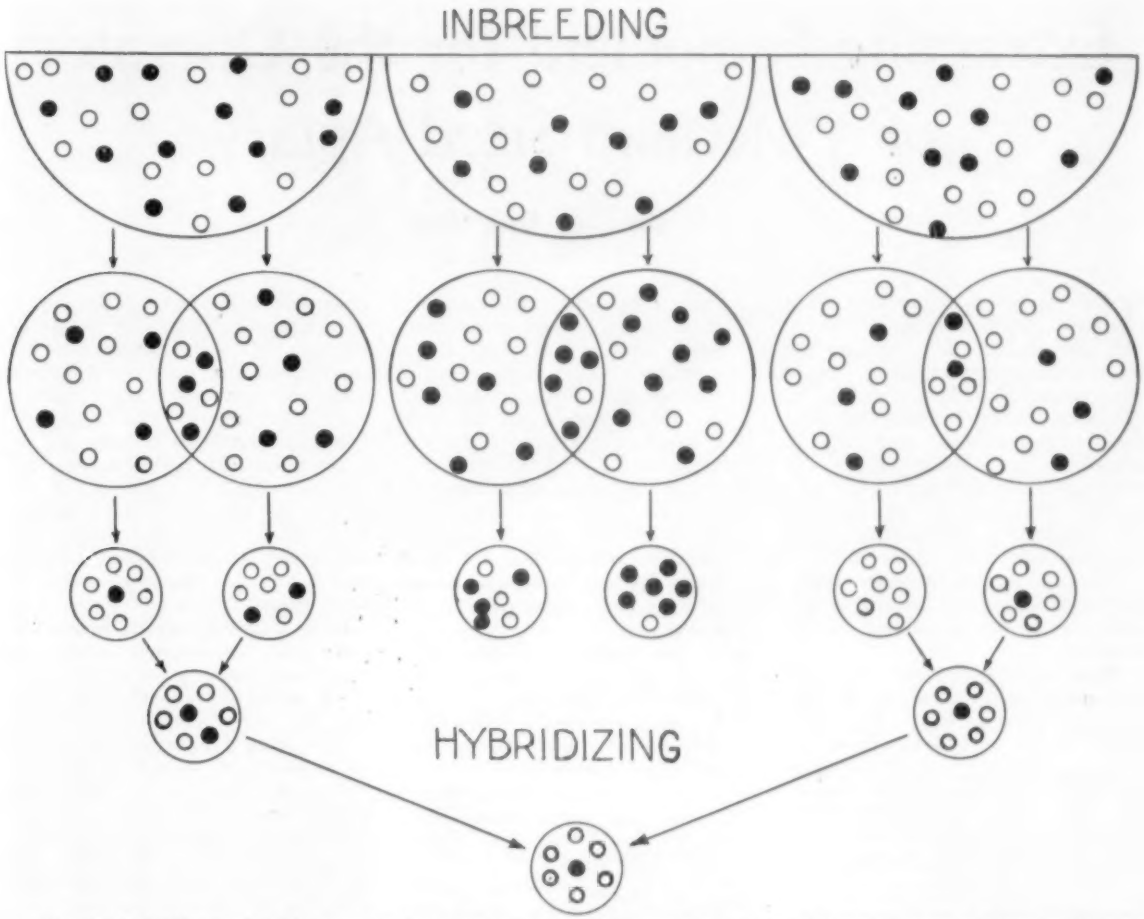


Fig. 9. Hybrid breeding is seen to be a system of forming small, extremely uniform populations from some larger random-mating system. Successive generations of inbreeding form: uniform inbred lines. These inbred lines are evaluated and the poor ones are discarded. Four good inbred lines are then crossed together to form one scientific hybrid.

Don't Sell Short . . . .

The Executive Committee of the American Beekeeping Federation in session at Denver, Colorado July 14 and 15th has observed the following crop and market conditions which it would like to pass on to you for your serious consideration in advance of the current marketing season.

There are some areas of the country that have a good to excellent crop. Other areas have only a fair crop while a few areas no crop.

The honey market this past season has, as you know, steadily advanced to the point where good white honey held until late winter and early spring brought from 13 to 16 cents. There is no carry-over of 1954 crop honey. Normally we have a 15 to 20 million pound carry-over. Even with a large 1955 crop there would apparently be no surplus. Imports of honey have been higher than normal to fill the demand. Industry has just announced major wage increases. The Federation's Marketing Committee activity will be greatly increased.

Taking the above favorable market conditions into consideration it would seem with good participation in the promotion program at the producer and packer level and orderly marketing, honey should continue to move at good prices.

If you are in an area which is enjoying a good crop please give serious consideration to the above marketing factors before selling your crop at a low figure. Some packers have expressed the view that if the 1955 crop can be marketed in an orderly manner without constant lower asking and selling prices by producers the higher market level can be retained. If a packer secures honey at a low figure the other packers are forced to buy at comparable figures to meet the competition offered by the original low priced lot.

If you need funds to finance your operations use the Loan Program. Details of the program are available at all Agricultural Marketing Service Headquarters in your county. This Loan Program should be put to more extensive use by honey producers to warrant continuation of the program and to provide orderly marketing of our product which is what the program is intended for. The Loan and Purchase Agreement figure is perhaps not as high as we or you would like to have it, but it is a means of giving you funds to operate on while still retaining the right to sell at a later date to your advantage if market conditions are more favorable.

May we again remind you that all honey placed under Loan or Purchase Agreement must be in new cans.

Extracting Equipment for the Operator of a Medium Sized Apiary

by Edwin J. Anderson

THE equipment described in this paper has been designed for extracting, heating, and straining the honey crop for the beekeeper who maintains an apiary with 20 to 75 colonies of bees. This equipment, except the extractor and capping knife, can be made locally by the beekeeper who is handy with carpenter's tools and the tinsmith who has equipment for bending and soldering sheet metal.

The sizes of the different items can be varied to suit the size of the apiary and the amount of honey produced.

Three recently designed pieces of equipment are included in the descriptions given here. Two are strainers, one of which is used for straining cold honey and the other is used for straining heated honey. The third one is a gravity flash-heating pan designed to flash heat honey before the final straining.

The complete equipment for extracting, heating, straining, and bottling the honey crop consists of the following items:

1. One or two capping tubs made from square galvanized iron wash tubs of the largest size available, each fitted with a wooden bar across the top to serve as a frame rest and with a removable screen on the bottom.
2. An electric uncapping knife.
3. Another large square galvanized iron wash tub with one side cut out and fitted with a wooden frame to hold a reserve supply of uncapped combs for the extractor.
4. A four frame reversible hand driven or a small power driven radial type extractor.
5. A tank to receive the honey from the extractor and the capping tub. (Described below).
6. A coarse strainer to be placed in the tank listed above (item 5), to strain the cold honey. (Described below).
7. A gravity flash heating pan to flash heat the honey. (Described below).
8. A strainer composed of two screen baskets, two cloth bags for straining the heated honey, and a tank to hold the strainers and serve as a reservoir for the honey before packing. (Described below).
9. Four white porcelain buckets or pails.
10. A tank with a water jacketed bottom for heating and liquefying honey in either 60 pound cans or in bottles and for containing the liquefied honey before bottling. (To be described later).

A description for the construction of items 1 and 3, the capping tub and comb rack, was first given in this Journal in December 1953. The plan of construction for these items is the same as then described but the largest square tubs available are purchased for this set of equipment. The wooden frames for the capping screen in the larger tubs are made stronger than first described in A.B.J. or are made from 1½ in. wide strips of ¾ in. thick white pine and they are braced across each corner with two strips of wood 1½ in. wide by ½ thick. Each one of these large size tubs will hold the cappings from about one thousand pounds of honey.

The construction of item 3, the comb rack, is different from the description given first in the Journal in that all the horizontal strips for the wooden rack are cut proportionally longer to make a wider rack that will fill the larger tub and hold more combs.

Items 2 and 4, electric uncapping knife and the extractor, may be purchased from any bee supply dealer. A power driven extractor is a real time saver where only one person is doing the extracting but is not as necessary when a second person is available at a reasonably hourly wage. Either the smaller power driven, radial extractor, made to hold from 12 to 20 frames, or the four frame, reversible type will serve the purpose for this size operation.

Item 5, the small tank, is made and used to receive the honey from the extractor, the uncapping tub and the tub holding the uncapped combs.

* Authorized for publication on April 29, 1955, as paper No. 1974 in the Journal Series of the Pennsylvania Agricultural Experiment Station.

Rack for uncapped combs and the tub in which it is placed showing cut out. (From December 1953, page 481).

Uncapping can with screen removed to show construction. (From December 1953, page 480).

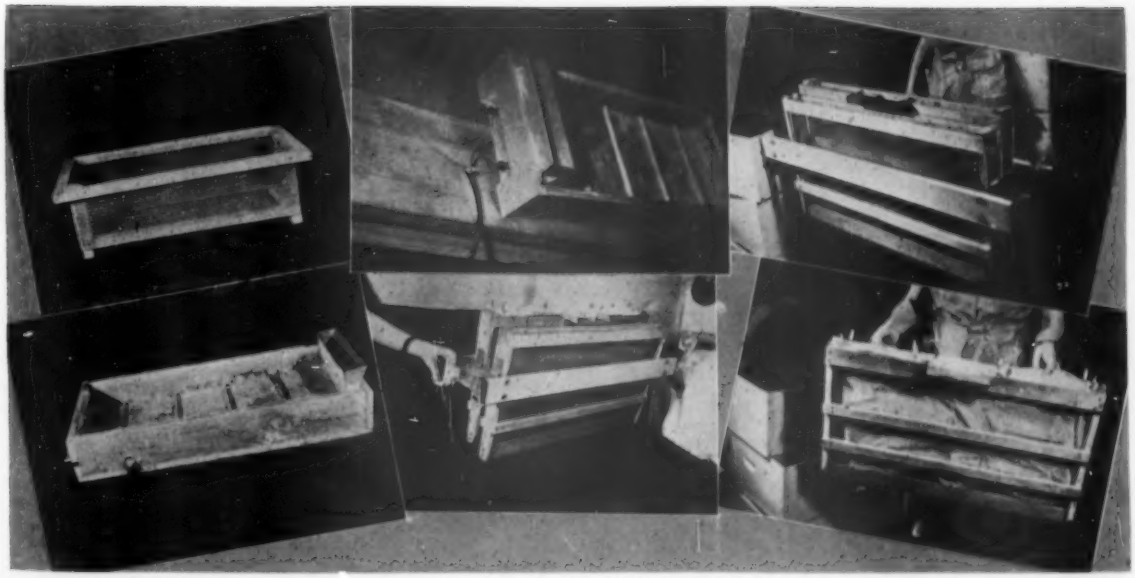


Fig. 1 (upper left) Strainer for cold honey. Fig. 3 (lower left) Gravity flash heating pan with top removed (details of this in Fig. 2, page 362). Fig. 4 (top center) End view of flash heating pan showing electric connections. Fig. 5 (lower center) Strainer baskets and rack to hold them. Only one basket contains a cloth strainer bag in this picture. Fig. 6 (upper right) Strainer baskets for warm honey without cloth bags. Fig. 7 (lower right) One basket with cloth bag.

This tank as well as the heating pan and the bottling tank are made as low in height as possible to reduce the height to which the honey must be lifted.

If the honey is to be lifted into the upper tank by hand, a tank of the following size is suggested, which is 32 in. long, 20 in. wide and 5 in. deep. A tank of this size will hold 160 lbs. of honey. A honey gate is attached to one end of the tank and arranged to open above the funnel of the heating pan. The gate is used to regulate the flow of honey into the heating pan.

Item 6, the strainer for cold honey, is made of hardware cloth, galvanized window screen and strips of wood. Two strainers are advisable if the honey to be extracted is partially crystallized.

The following material is needed for each strainer: Standard 13/16 in. thick, clear white pine lumber is cut to the following dimensions:

2 strips, 1¼ in. by 20¾ in. long.
2 strips, 1¼ in. by 14¾ in. long.
2 strips, 1¼ in. by 18 in. long.
2 strips, 1¼ in. by 12 in. long.
1 strip, 1⅛ in. by 5¼ in. long.
2 strips, ¾ in. by 12 in. long.

Two or 3 mesh galvanized hardware cloth cut to the following dimensions:

1 piece 6 in. wide by 61½ in. long.
1 piece 12 in. wide by 18 in. long.

Galvanized window screen cut to the following dimensions:

1 piece 6 in. wide by 61½ in. long.
1 piece 12 in. wide by 18 in. long.

To make the strainer take the 1¼ in. wide strips and make a wooden frame 14¾ by 20¾ in. similar to a picture frame by halving the corners together, Figure 1. Do the same for the 12 and 18 in. pieces to make a frame 12 by 18 in. Nail the 12 by 18 inch window screen first, then the hardware cloth, to one side of the small frame which will be the bottom of the strainer. Nail the two ¾ in. square pieces of wood on the ends over the screen, to form the legs of the basket. Bend the long piece of hardware cloth and window screen to form the four sides of a box 12 inches wide by 18 long, Figure 1.

Tack the smaller wooden frame inside one edge of the window screen and place the hardware cloth outside the window screen. Tack the larger frame on the top edge and outside of the two screens. Nail the 1⅛ by 5¼ in. block of wood in the inside corner where the ends of the screen come together and then fasten the screens and frames to it. The smooth edges of the screens are nailed inside the larger frame or on the top of the strainer. Cover all the edges of the screen with the ¼ in. thick strips of wood.

This screen basket when complete makes an ideal and efficient strainer for cold honey. The hardware cloth supports the window screen.

Item 7, the gravity flash heating pan, is a job for a tinsmith or one with some experience at soldering sheet metal.

This item of equipment consists of four units: (1) a galvanized iron tank 18 in. wide, 40 in. long and 6 in. deep. (2) The heating pan, 16 in. wide, 40 in. long, and ¼ in. thick with a full width funnel at one end. (3) Two electric heating units or other type of heating equipment. (4) A thermostat to control the water temperature if electric heating units are used. See figures 2, 3, and 4.

If a gas or oil stove is to be used to heat the water in the tank, it is made as indicated, 18 by 40 by 6 inches deep with a slot cut in one end of the tank at a distance of 1 in. from the bottom and 1 inch from each side. This slot is marked 16 in. long and 5/16 in. wide. This slot is made with only one lengthwise cut. The cut is made on a line marked along the center of the 5/16 in. slot. Both ends are cut the full (5/16 in.) width of the slot. The top and bottom halves of the slot are bent out so the two edges can be soldered, one to the top and the other to the bottom of the thin pan that extends through the opening. These narrow edges can be bent only while the metal is flat and before it is soldered together to form the tank.

If two electric units are to be used as a source of heat, a second slot is cut in the opposite end of

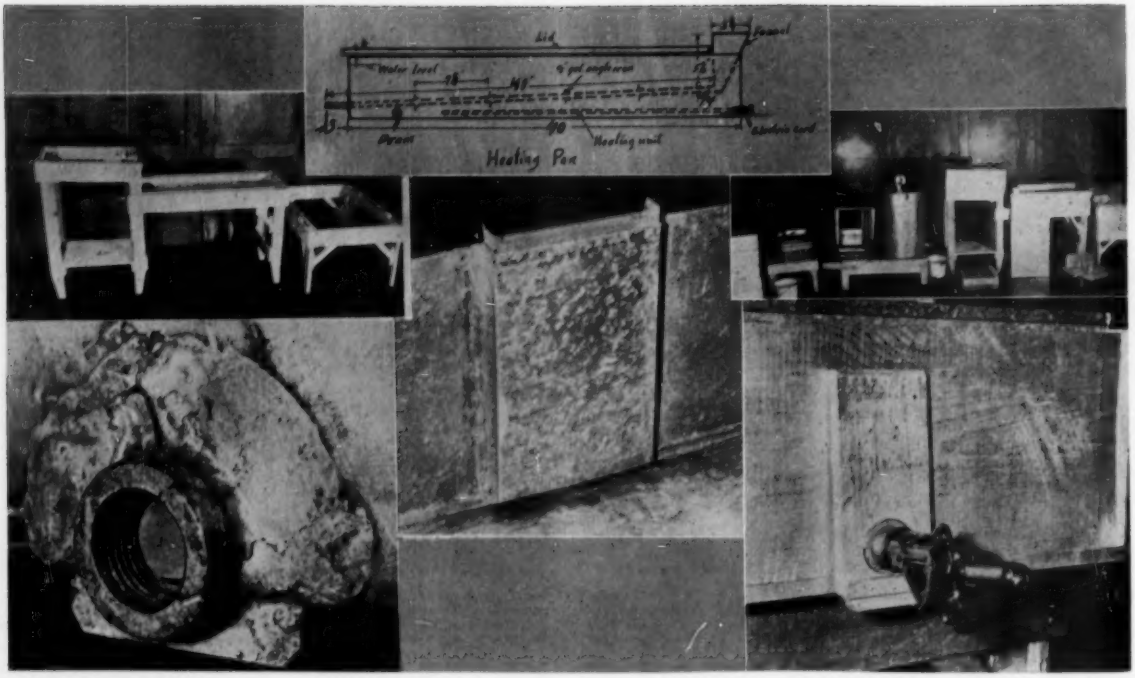


Fig. 8 (upper left) Stands for equipment including tanks and flash heating pans. Fig. 2 (top center) Drawing of gravity flash heating pan. Fig. 9 (top right) The complete set-up but with an older style strainer. Fig. 10 (mid center) A close up view of the baffle and screen that is soldered over the outlet from the tank. The screen is partly withdrawn to indicate its construction. Fig. 11 (lower left) A close up of the angle iron and galvanized iron floor plate as soldered to the tank. Fig. 12 (lower right) The honey gate flange is braced to the wooden box with a board to prevent it from breaking where soldered.

the tank. This one is cut 11 in. long by ⅝ of an inch wide and ⅝ inch from the bottom of the tank. The ends of the two electric units are passed through and attached to a piece of 22 gauge galvanized iron, which had been cut 12½ in. long by 3 in. wide. The units are inserted through holes bored in this metal so they are 1½ in. from each end of the galvanized iron and 3 in. apart. The heating units with the galvanized iron attached are inserted into the tank and the galvanized iron is soldered to the edges of the slot in the tank. A piece of one fourth inch angle iron is soldered to the bottom of the tank as a rest for the opposite end of the electric units. The angle iron prevents the units from resting on the bottom of the tank and permits a circulation of water around the heating units.

The heating pan is made ¼ in. thick, 16 in. wide and 41 in. long with a funnel as part of one end.

The pan is made from 4 pieces of stainless steel cut as follows:

One piece, 46 in. long by 16½ in. wide. It has ¼ in. of each side bent to a 90 degree angle and 5 in. of one end bent to a 90 degree angle in the opposite direction from the ¼ in. edges. It forms the top of the pan.

One piece, 48 in. long, 16⅝ in. wide with ¼ in. of each side bent to a 90 degree angle and 6 in. of one end bent to a 120 degree angle but in the same direction as the ¼ in. sides were bent to make the bottom of the pan.

One piece, stainless angle iron 3/16 by ⅜ in. by 40 in. long is soldered inside and lengthwise along the center of the second or longer sheet at a distance of 8 in. from each side. The wider side of the angle iron is soldered to the bottom of the pan. The two long sheets are then soldered together with the top or shorter piece placed inside the bottom. The funnel is completed by soldering two pieces of stainless steel between the open ends. Each of these two pieces of stainless steel is cut 4 inches wide at the top and 1 inch wide at the bottom. The long side is cut 6 inches and the short side 5 inches long, the short side is cut at right angles to the top and bottom.

Eight pieces of ½ inch galvanized angle iron 16 in. long are soldered crosswise to the outside of the pan. Four pieces are placed on top and four on the bottom equidistant from each other and from the ends of the pan. The angle irons inside and out keep the top and bottom of the pan straight and prevent bulging from the pressure of the honey or water. The completed pan is placed in the tank with the end pushed through the slot and is soldered to the tank so that the joints are watertight. The funnel, at the opposite end of the pan, rests on the top edge of the tank and is held in place with a piece of ½ in. angle iron soldered to both the funnel and the tank. This end of the pan is raised so that it is 2 in. from the bottom of the tank. This difference in height between the two ends provides a 1 inch slope over the length of the pan causing all the honey to drain by gravity from the pan when the flow of honey into the funnel is cut off. The ¼ in. thickness of the pan causes the honey to contact both the top and bottom and to be heated much more efficiently than where the honey flows down a pan that is open on top. The pan is heated by the water surrounding it in the tank while the water in turn is heated by electric units, steam pipes or direct heat on the bottom of the tank.

Two 750 or 800 watt heating units will heat 1200 pounds of honey to 125° F. for straining in a period of

6 to 7 hours. Electric current of 230 volts is more efficient than a 115 volt line and should be used if available. If the electric line is overloaded, the units will not be able to do an efficient job of heating the water and honey. Flexible immersion units are sold by the American Instrument Co., Silver Springs, Maryland.

The tank is provided with an outlet to drain the water when the tank is not in use. The tank is enclosed in a wooden box, as shown in figures 3 and 4, to avoid excess loss of heat, especially when electric units are used as a source of heat. The temperature of the water is controlled by means of a thermostat which is normally set at 175° F. but it may be set for other temperatures if desired.

Finally, a metal and wood cover is made for the top of the tank.

If an open flame is used to heat the water in the tank all wood is kept at a safe distance from the flame to prevent a fire hazard. The tank is placed on a stand made of angle iron rather than on one made of wood.

Item 8, the fine strainer is composed of two baskets containing bags made from 90 mesh bolting cloth. The two baskets hang in a wood and metal frame which in turn hangs in the bottling tank, figures 5, 6, and 7.

The materials needed for each basket are:

2 wedge shaped pieces, 1⅛ in. thick clear white pine 14¼ in. long, ¾ in. wide at one end and 2 in. wide at the opposite end.
1 piece white pine, ¾ in. thick by 2¼ in. wide by 30 in. long.
2 pieces white pine, ¾ in. thick by 2 in. wide by 32¼ in. long.
4 pieces white pine, ¾ in. thick by 1⅛ in. wide by 32¼ in. long.
68 inches of ½ in. thick strips of wood to cover the edges of the hardware cloth.
1 piece 3 or 4 mesh galvanized hardware cloth 30 in. wide by 32¼ long.

(Purchase hardware cloth that is 30 in. wide to avoid the extra cutting and the sharp points that would project above the baskets and tear the cloth bags).

To make the baskets nail the narrow end of the two wedge shaped pieces to the ends of the piece 2¼ in. by 30 in. Nail the hardware cloth to this frame so the wide end of the wedge is left open to form the top of the basket.

Nail the 2 in. by 32¼ in. pieces to the top of the basket and over the screen which is in turn tacked to these pieces. The screen will project ⅜ in. above the two inch pieces on the top of the basket.

Nail the 1⅛ in. pieces across the outside of the basket at distances of 5 and 11 in. from the bottom. They strengthen the basket and prevent it from bulging. A notch 1 in. deep by 7 in. wide is cut through both the top of one 2 in. strip and the hardware cloth of one side of one basket and a funnel is nailed in the notch so the honey can flow from the first to the second basket if the first one becomes partially clogged.

The bags for the baskets are made 14 inches deep by 33 in. long. They are inserted into the baskets and are held to the screen on the top of the basket with the small type of spring clips used for electric wire terminals. The edges of the clips are sanded down with emery cloth so that they do not cut the cloth bags.

The frame to hold the baskets is made of two pieces of clear white pine ¾ in. by 3½ in. wide and just long enough to fit inside the tank less ½ in. or 35½ in. long for the tank listed below. Two pieces of galvanized iron (22 gauge) are cut 5 in. wide by 11 in. long. One edge of each piece is bent at right angles for a distance of ¾ of an inch on a long edge, to form the bottom, then ½ in. of the top edge is bent over and hammered flat. One inch of both the two ends is also bent to a 90° angle in the same direction as the bottom ¾ in. The two pieces, when complete, are bolted between the 3½ in. strips at the proper distance apart (32⅝ in.) so the baskets can be hung between them. Hangers of galvanized iron or wooden blocks are placed on the ends of the baskets so the one with the trough extends 3 in. above the tank and the other 2 in. above the tank. This arrangement permits the honey to flow from the upper to the lower basket if the first becomes partially clogged.

Hangers of ⅛ in. strap iron are placed on the ends of the two boards so they rest on the top edges of the tank and hold the baskets in place.

Item 8, the bottling tank is made 12½ in. deep, 36 in. wide, and 40 in. long and holds 900 lbs. of honey. A baffle is made from a piece of galvanized sheet metal 12¼ in. wide by 15 in. long. It is bent as shown in figure 10 so that ½ in. of each end can be soldered to the tank and a space 2 by 10 in. is left between the baffle and the tank. The baffle is soldered over the outlet and ¼ in. from the bottom of the tank. The baffle keeps the foam in the tank until the honey level drops to a point near the bottom of the baffle, figure 10.

An outlet hole is cut in the end of the tank flush with the bottom of the tank. A piece of 22 gauge galvanized angle iron ¾ in. by ¾ in. by 2 in. long is soldered to the bottom of the tank below the hole and flush with the end of the tank. The bottom of the plate that holds the honey gate is soldered to both the tank and the angle iron. This arrangement permits all the honey to flow from the tank, figure 11.

A piece of window screen 12 in. wide by 14 in. long is bent for a distance of 2 in. on each end and is then placed inside the baffle and pushed against the bottom of the tank to prevent bees or other large objects from getting into the containers as they are being filled, figure 11.

Two stands are made for this equipment from 1 in. boards and 2x4's. Then the tanks and heating pan are arranged on the stands so the honey flows from the upper tank into the funnel of the heating pan, then into the straining basket in the large tank, figure 8 and 9. The volume of honey flowing from the outlet of the upper tank into the funnel is regulated to give the honey the proper temperature as it flows from the heating pan, the temperature should be between 120 and 130 degrees Fahrenheit. The hotter the honey, the faster it flows through the strainer cloth. Cold honey will not flow through a 90 mesh cloth fast enough for any practical purpose.

Honey heated to 130 degrees F. will seldom ferment within a period of one year providing the honey was properly ripened before it was extracted. A temperature of 150° F. is required to kill all the yeast in the honey. A temperature of 155° F. is required to prevent crystallization for longer periods of time. Honey heated to this temperature should be bottled at once in order to lower the temperatures of the honey and prevent burning. If the honey is partially crystallized when extracted, a temperature of 174° F. will be required to liquefy all the crystals. The honey must also be cooled within four minutes to prevent burning which occurs quickly at this high

temperature. Most beekeepers with smaller apiaries are not interested in using such high temperatures so further discussions on cooling will not be included in this article.

This equipment is described for use without a honey pump but a pump may be added if desired. If a pump is used, it will eliminate the task of lifting all the honey by hand and will remove the restrictions on the depth of the two tanks since the height of the tanks will not be a problem.

A description of the tank, item No. 10 for liquefying and bottling honey, will be presented in an article to appear at a later date.

Honey and Your Diabetes No. 6

by D. C. Jarvis, M.D.

WHILE endeavoring to learn from native Vermonters the nutritional pathway that brought an individual to the latter years of life with good eyesight, good hearing, good mental vigor and good physical vigor I learned that in addition to the avoidance of wheat foods, white sugar, muscle meats such as beef, lamb and pork there was one more food marked taboo here in Vermont. This was citrus fruits and citrus fruit juices such as oranges and grapefruit. This was surprising to me because from my reading of nutritional literature I had been led to look upon citrus fruits and citrus fruit juices as being an excellent food whose use was to be encouraged. I asked why citrus fruits and citrus fruit juices should be avoided. I was given the following reasons:

1. Citrus fruits and citrus fruit juices will often produce headaches of the migraine type. These migraine headaches were referred to as "sick headaches." On learning this I began asking patients complaining of headaches if they ate citrus fruit or citrus fruit juices each day. On learning they did I asked them to omit the citrus fruits and citrus fruit juices in order to learn if they were responsible for the headaches. Much to my surprise the omission of the citrus fruits and the citrus fruit juices often resulted in a disappearance of the headaches.

2. I was told that citrus fruits and citrus fruit juices taken daily would often block up the ears. I began to check this observation and found it was true in some individuals complaining of closure of the eustachian tube. Omission of orange and grapefruit and their juices often brought about a clearing up of the ear condition permanently.

3. I was also told that oranges and grapefruit would produce wet eyes and a wet nose. Again I found that to be often true here in Vermont.

4. Oranges and grapefruit would cause rough places to appear on the skin surface of the body that looked as if they had been rubbed hard with a coarse bath towel. This I found to be often true.

5. Oranges and grapefruit would bring about the appearance of arthritis in some individuals which I also found to be true.

Perhaps here in Vermont we have been led astray by the advertising of the citrus fruit growers. In Vermont apples, grapes and bush cranberries grow wild. When they grow wild they are quite sour which indicates their high acid content. Nature perhaps knows best the fruits that are best suited for those of us who live in Vermont.

It is helpful for an individual with diabetes mellitus to know the changes in the body that may take place from eating citrus fruits when working out the daily food intake. In order that I might learn more about the foods forbidden by native Vermonters who live close to the soil I arranged for 12 little children five years or less in age and 12 adults to serve as human guinea pigs for two years. A daily food diary was kept as was also the reaction of the urine on rising in the morning and before the evening meal with Squibbs Nitrazine Paper, the number of bowel movements each day, the number of times urine was passed in 24 hours and whether the sleep at night was sound, fairly sound or restless. During this two year period I learned that wheat foods, white sugar, muscle meats such as beef, lamb, pork and ham, citrus fruits and citrus fruit juices produced an alkaline urine reaction instead of the normal acid reaction. Sickness appeared on an alkaline urine background and recovery from sickness appeared when the urine reaction shifted back to the normal acid reaction. Continued freedom from sickness was related to maintaining an acid reaction of the urine from day to day. Little children I learned like sour drinks. Their favorite was cranberry juice. When this was made from cranberries they wanted it as sour as the mother could make it.

U.S. Re-Instates Honey Reports

Statistics for bees and honey have been strengthened by the reinstatement of the July report on number of colonies of bees and by the October report on production and stocks of honey, the U. S. Department of Agriculture has announced. These two reports, in addition to the annual report on honey, restore honey production statistics to the 1951 level. We understand some reports on peanuts have also been re-instated.

The July colony numbers report is now available from the Agricultural Marketing Service which issued it from Washington, D. C. It shows a total of 5,233,000 colonies on July 1, 1955 as compared to 5,465,000 colonies at same date last year. The report shows California leading with 537,000 colonies, with Ohio, Texas, Minnesota, Florida, Wisconsin, and New York in order, all with more than 200,000 colonies.

The average losses for the winter of 1954-55 were 17 per cent, and the condition of colonies as of July 1, 86 per cent of normal with condition of nectar plants 79 per cent at the same date.

Beekeepers Are Farmers . . .

Wisconsin beekeepers, with 50 colonies of bees or more, may now enjoy the same truck license, taxes, insurance and so forth as any other Wisconsin farmers according to a new law just promulgated in that state. Heretofore, beekeepers were not classed as farmers. But Section 94.761 of the statutes has changed that. If you have 50 colonies of bees in Wisconsin, you are a farmer.

However, the occupational tax on bees (colonies) has been boosted from 10c to 25c. The two were not allied. There was a necessity of raising more funds for inspection work.

Woodman Jubilee . . .

My wife and I had the pleasure of attending the annual field meet of the Michigan Beekeepers Association held this year at the fair grounds in Ionia on July 15. There were some 200 there for a picnic lunch and supper furnished by the amiable ladies. There were the usual demonstrations and program.

But the highlight was the special exercises in the evening to commemorate the Diamond Jubilee and anniversary of the founding of the A. G. Woodman Company which has been serving Michigan beekeepers since 1880, in the three generation combination of L. C. Woodman, A. G. Woodman and A. Baxter C. Woodman.

One could sense not only the satisfaction towards this amiable firm, but the love and true sentiment on the part of those present.

It makes one wonder, just what the elements are which make for this degree of fine feeling. Honesty and fair dealing, of course. But many firms have this and still fail to "click" as do the Woodmans. No, there is something more I would call it the art of "belonging"; of being able to enter into the other fellow's aspirations and problems with a true desire to help.

Cutting of the ceremonial cake and presentation of a special plaque to the Woodmans in honor of the occasion, set off a truly highlighted day.

Our Apologies, David Lade . . .

In the article by Geo. P. Georghiou in May, "Controlling Hornet Damage," page 193, there is a picture of a hornet's nest without credit to the photographer. The picture is from David Lade, of Amir, Israel. Our apologies, Mr. Lade. The omission was called to our attention by A. Ch. Kalman, Mosav Gan-Haim, Israel, who also says: "For 15-20 years we protected the hives in the way described by Mr. Georghiou, but in the last ten years a bait has been developed, through Mr. Raskin of the Plant Protection Service so that today we do the job in 1-3 days that used to take many days."

Industrious Bees . . .

It is the number of **industrious** bees in the field that affect the size of the honey crop; not just the number of bees.

M. H. Haydak, St. Paul, Minn.

Harvest Time

by David A. King

IF I had been an old timer at beekeeping, I would likely have taken off the honey that my colony had produced long before this. Another thing, likely I would have had a whole lot more honey to take off! As things stood, late in the month of October when the nights were chilly I at last found the time to find out what my bees had done during the summer months and to take off the surplus honey.

Opening the hive, I found that they had drawn all of the comb in the first super and practically all of it was about half an inch thicker than the frame itself. It was capped solid. I believe that there was nearly as much honey in those thick combs, eight of them in the ten-frame super, as there would have been in ten combs of normal thickness. The top super, the last one I had put on had been worked pretty well; that is the bees had drawn almost all of the foundation to about half-depth cells and many of these were full of new honey. Evidently the sharp frosts we had been having had caused the honeyflow to cease abruptly.

I lifted off the supers and brushed the bees off the combs near the hive entrance.

This took a little more time than it would have taken to take the honey by using a bee escape between the supers and the main hive body. But by doing this way, I saved the cost of the bee escape.

Another thing. It is always stated in the literature that, without excluders, the queen will almost always lay in the super. There were about two or three square inches of dark comb on about two of the frames in the super. Presumably this dark comb had been used to rear some brood in. Aside from this, the combs in the super were as free of brood as if I had used excluders. I am convinced that my bees worked the supers better without the excluders—and I saved the cost of the excluders!

So I had almost wound up my first season as a beekeeper. After a very poor start, I had managed to harvest about 25 pounds or more of excellent comb honey. It was clear and aromatic. From its flavor, I would judge it to be mostly alfalfa with enough other honey mixed in to give it an excellent bouquet and flavor. I don't believe that extracted honey (which **must** be heated during its processing) can ever compare in flavor with fresh comb honey. This is one of the rewards of keeping your own bees. Still another is the opportunity to study these interesting creatures at first hand.

Evidently the bees themselves were preparing for the cold weather. The pile of dead at the hive entrance and near the front of the hive began to grow higher. Looking through these bees, it could be readily seen that most of them were drones. Likely many of these were the drones born of the activity of the laying workers when the first part of the colony was just being established. For the mysterious reason which prompts bees to tolerate drones during the lush months of summer, these idle fellows had been kept in luxury and fed during all the months since they had emerged from their cells. Now they were dragged out to die—all for the good of the colony.

Still later on, I noticed some larvae and even some brood in more advanced stages being dragged through the hive entrance. Probably these had been chilled during some of the frosty nights we were beginning to have—or else were simply being eliminated as a needless drain on stores which must be husbanded for winter use.

I have read a great deal pro and con on the subject of packing bees.

Winters in Utah are usually comparatively mild. Mild, that is, compared to those in the plains states and in most parts of Canada. I doubt if much is to be gained here by packing bees. If they are left alone, the comparatively frequent days when the temperature goes above the 50° mark will have the opportunity to warm the interior of the hive and the bees will be able to take their cleansing flights.

Accordingly, my preparation for the winter has consisted of moving the hive to a location where it will be somewhat more sheltered from the prevailing westerly winds and making sure they have plenty of stores. I intend to winter them in the two-story hive they have spent the summer in. Next spring will show whether I was wrong or right.

Beehive Cake . . . .

Last fall when the Newspaper Food Editors Conference was held in New York, General Foods served this beautiful Bee Hive Cake to the editors when they visited the new streamlined test kitchens in White Plains.

You will want to make this cake because it is really good and is a "conversation piece" as well. We might add that one of these little handmade bees was worn by each food editor. This was a salute to the Beekeepers of America.

3 cups sifted cake flour

1¾ cups sugar

2 teaspoons double-acting baking powder

1½ teaspoons salt

1 cup shortening (at room temperature)

** Milk

3 eggs and 1 egg yolk, unbeaten

1½ teaspoons vanilla

¾ cup shredded coconut, finely cut

** With vegetable shortening, use ¾ cup milk. With butter or margarine, use ½ cup milk.

1. Into sifter, measure sifted flour, sugar, baking powder, and salt.

2. In mixing bowl, place shortening; stir to soften. Sift in dry ingredients. Add milk and mix until all flour is dampened. Then **beat 2 minutes** at a low speed of electric mixer, or 300 vigorous strokes by hand.

3. Add eggs and yolk and vanilla and **beat 1 minute** longer in mixer, or 150 strokes by hand. Fold in coconut.

Baking: Pour batter into 4-quart metal mixing bowl, which has been greased and lightly floured. Bake in moderate oven (375° F.) about 1½ hours, or until done. Cool in bowl about 15 minutes. Then loosen from sides with spatula, turn out, and cool on cake rack.

Frosting: Prepare Fluffy Honey Frosting. Spread over rounded side of cake and draw ridges with spatula around sides to make cake resemble a beehive. Decorate with make-believe honey bees, if available.

Fluffy Honey Frosting: Beat 2 egg whites with dash of salt until stiff enough to hold up in peaks, but not dry. Pour 1 cup honey in fine stream over egg whites, beating constantly about 10 to 15 minutes with sturdy egg beater, or 6 minutes at high speed of electric beater, until frosting will hold its shape.

American Honey Institute.

The American Southwest . . .

Simon and Schuster (New York) have just published the first book in a new series of Regional Guides to the United States—THE AMERICAN SOUTHWEST. It captures the color and excitement of this unique section of our country in a way that is both enjoyable and profitable. The book was written by Natt N. Dodge, Regional Naturalist for the National Parks Service, and a 34-year resident of the southwest, and Dr. Herbert S. Zim, Professor of Education at the University of Illinois. With this book you have a tour guide, history, descriptive flora and fauna, geology; color plates in profusion; inexpensive, too, cloth bound $1.95 and paper $1.00.

Natt Dodge at one time, way back when, was a beekeeper and honey producer. He also was the manager of a honey packing plant in Seattle. But the great spaces and their living things captured his fancy and he now ranks among the most efficient and most authoritative of our field naturalists.

Eat Your Troubles Away . . .

Lelord Kordel, trained in biochemistry and follower of Von Liebig, father of animo acids, has published a new book, "Eat Your Troubles Away." Earlier his book, "Eat and Grow Younger" has seen heavy sales.

In this book, Kordel emphasizes the importance of proper foods, as well as their moderate assimilation. Honey plays a part, inasmuch as honey is mentioned many times in the book as being fortified with vitamins, increases endurance, assimilates easily, adds to mental alertness and gives energy for grueling work.

He recommends a spoonful of honey between meals—and tupelo honey as being heavy in levulose. He reports also on royal jelly and its composition as well as the part that pollen may play in the diet.

The book is cloth bound, 300 pages and sells for $3.00 at World Publishing Co. in Cleveland. The American Bee Journal has a few copies for the convenience of its subscribers at the above price postpaid.

Queen Excluder for Drying . . .

A queen excluder makes a fine thing for the women folks to dry wool sweaters on; use three or four for large garments.

Paul J. Nichols, Douglas, Arizona.

MEETINGS

Southern States Beekeepers Federation Convention
George Vanderbilt Hotel,
Asheville, North Carolina
October 10-12

Program

October 10

8:30 Music and registration.
9:30 Let's Go:
Invocation
Welcome—Mayor Earl W. Eller.
Keynote Address—Lynn Dewey.
Program Highlights — W. A. Stephen.
President's Address—A. D. Hiett.
10:30 Hiding Your Light—Mrs. H. Grace.
11:10 Music.
11:30 Roll Call and Business Session.
12:00 Let's Eat.

The afternoon session is divided into two parts, advanced and less advanced.

Advanced

1:30 Panel Discussion—Chemicals and Beekeeping—Beekeepers, Researchers, Administrators, etc., will present ways and means of preserving our bees while killing other insects, diseases, weeds, and so forth.
3:00 Music.
3:15 Honey Price Support Program—Harold J. Clay.
3:35 Our American Beekeeping Federation—H. A. Schaefer.
3:50 Our American Bee Breeders Association—W. W. Wicht.

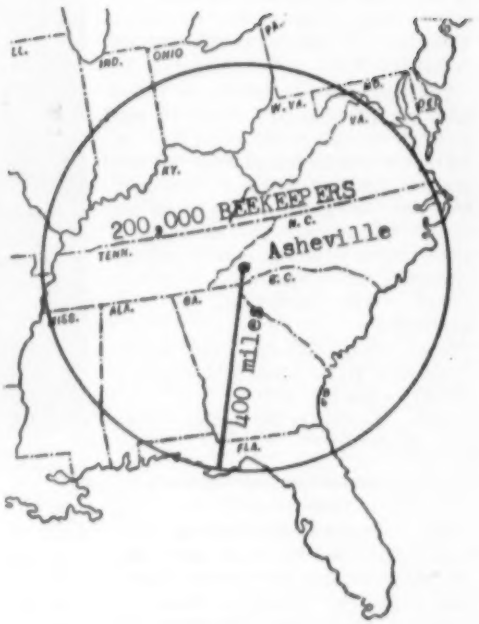
Less Advanced

1:30 Assembling Equipment — G. W. Vest.
Inspection and Disease Recognition—H. W. Weatherford.
Music.
Packing Chunk Honey — A. V. Dowling.
Heating and Packing—(To be announced).
Winter Management — W. A. Stephen.
Question Box.
4:15 Auction of Honey and Equipment—Guy Snelson, Auctioneer.
7:00 Banquet—Dr. F. H. Jeter, Toastmaster.
Speaker—(To be announced)
Awarding of honey cooking prizes, door prizes, and so forth.

October 11, 1955

8:45 Music.
9:00 Invocation and Announcements.

If you live in a radius of 400 miles of Asheville you are one of 200,000 beekeepers for whom this meeting has been planned. Just because you live in another state is no reason why you should not come to North Carolina. In fact, that should be a very good reason for coming. If we have a tenth of one per cent of the number of beekeepers in the area, there would be an attendance of 200. If one beekeeper came out of 100, we should have 2,000 in attendance.



9:15 Publicizing Your Business—F. H. Jeter.
9:45 Public Relations Workshop—How to put on radio and TV programs—Ted Hyman, Mrs. H. Grace, F. H. Jeter, and personnel picked from audience.
11:00 Music.
11:15 Honey in Cooking—(To be announced).
11:45 Committee Reports and Election of Officers.
12:00 Let's Eat—North Carolina Beekeepers—Club Room, S & W Cafeteria.
1:30 Panel Discussion—Chemicals in Disease Control—Beekeepers, Inspectors, Researchers, and so forth, will bring us up-to-date on diseases and their control.
2:45 Music.
3:00 Beekeepers Big and Small—J. I. Hambleton.
3:30 Question Box.
4:30 Adjourn.
8:00 Films and Slides.

October 12, 1955

9:00 Assemble for tour of Great Smokies at Cherokee Village—Visit Museum of Okonaluftee Village.
12:00 Lunch—Boundary Tree Motor Court in Indian Reservation.
1:00 Proceed to Gatlinburg, Tenn. via Clingman's Dome.

Especially for the Ladies

October 10 — Afternoon trip to Biltmore House in beautiful Biltmore estate.

October 11—Afternoon visit to TV Studio.

Very Special—Open to all ladies registered at convention. To be ready for judging by 11 a. m. Monday, October 10.

Cooking Contest

1. Breads, Yeast — (a) Whole wheat; (b) White. Quick—(Baking powder or soda); (Fruit and Nut Loaf).

2. Rolls—(a) Whole wheat; (b) White (plain); (c) Pecan rolls with honey glaze.

3. Muffins—(a) Bran (plain); (b) Bran (fruit).

4. Candy—(a) Divinity; (b) Chocolate Fudge.

Rules:

1. Honey must be used as chief sweetening agent in breads and as an ingredient in candies.

2. Cooking will be judged on the basis of: 1. General appearance; 2. Lightness; 3. Quality of Crumb; 4. Flavor.

The contest is restricted to classes which will be easy to carry and should keep well. It is suggested that the foods be well wrapped in

aluminum foil to preserve their freshness.

Prizes? You may be sur-prized!

Anyone wishing information with regard to scenic routes to follow and places of interest to see on the way to or from the convention may obtain a map and advice from the Asheville Chamber of Commerce, Asheville, N. C.

Southern beekeepers have been hard hit this year and few have any quantity of honey to contribute to the American Honey Institute Honey Auction. Please bring a case or a few jars of some of your nicest honey with you. We shall have some sourwood. How about orange blossom, tupelo, gallberry, palmetto, clover, vetch, basswood, or your specialty?

For reservations write: The George Vanderbilt Hotel (One of Asheville's finest), Asheville, N. C.

Rates: Single, $4.50; double, $7.00; twin, $8.00.

General view of the Smoky Mountains from Lou Harshaw of the Asheville Chamber of Commerce. Part of the program is a scenic drive through the Smokies, with the evening meal at the Cherokee Indian Reservation.

Songs of Beedom at Southern Conference

The American Bee Journal last winter furnished W. A. Stephen, Extension Specialist for North Carolina, a copy of "Songs of Beedom," a booklet of bee songs printed in the days when Geo. W. York was the editor of the American Bee Journal. Stephen has secured a quartet to sing some of the Songs of Beedom at the convention. He hopes that there will be a big crowd to join in on the chorus.

Middlesex Co. Beekeepers Assoc. Westford, Sept. 24

The September meeting of the Middlesex County (Mass.) Beekeeper's Association will be held on Saturday, September 24, 1955, at the home of Mr. and Mrs. Charles Hemboldt, Westford, Mass. This is the final outdoor meeting of the season, and at this meeting there will be a drawing for a lucky winner of the Club Hive. The hive was started in April with packaged bees and has made excellent progress during the summer months. One super of honey has already been removed from this hive. In addition to the hive, there will be other gifts presented to lucky members of the Association.

The August meeting was held on Saturday, Aug. 27, at the home of Mr. and Mrs. Alymer Jones in Malden, Mass. A good crowd was on hand to inspect the hives of our treasurer, and also the Club Hive. After the business meeting, the members and guests enjoyed a picnic supper, and ice cream and coffee provided by the Association. Many thanks to Al, and his good wife Martha, for their hospitality.

L. C. Proctor, Sec.

Georgia Annual

The Georgia Beekeepers annual meeting will be held at Hamerville, October 17-18.

C. H. Herndon, Sec'y.

Midwestern Beekeepers Assoc. Kansas City, Mo., Sept. 11

The Midwestern Beekeepers Association will meet with Mr. and Mrs. Frank McLaughlin, 328 South Monroe, Kansas City, Mo., on September 11 at 2:30 P. M. Refreshments will be served and a drawing prize given. There will be a general discussion on marketing and fall feeding.

Mrs. William Brite, Sec'y.

Westchester County New Rochelle, N. Y., Sept. 11

The Westchester County Beekeepers Association will hold a joint meeting with the Bronx County and the North Jersey Beekeepers Association. This meeting will be held at the home of Mr. and Mrs. Henry Kroger, 3661 Eden Terrace, Bronx, N. Y. (near Dyre Avenue and Boston Post Road) at 2 P. M. sharp on Sunday, September 11th. Refreshments will also be served.

An invitation is extended to all beekeepers and their friends. Let's make this a good turnout, fellow members.

Mrs. Alfred Roth, Publicity

Illinois State Fair Entrants in the American National Honey Show

Ira Bowers, Decatur, Ill.
Kurt Ciper, Mt. Clemens, Mich.
Nick Frank, Sr., Mt. Clemens, Mich.
Norman Harper, Belleville, Wis.
Ann Hathaway, Manhattan, Ill.
Helen's Apiaries, Welch, Minn.
John A. Larson, Taylor Falls, Minn.
M. C. Morgan, Blue Mound, Ill.
Herbert Nolda, Ravenna, Nebr.
Henry F. Puppe, Nebraska City, Nebr.
Rocke Apiaries, Eureka, Ill.
Elmer L. Smith, Benton Ridge, Ohio.
Willard W. Smith, DeLand, Ill.
George Toft, Buda, Ill.
Wm. Wallanches, Downers Grove, Ill.
Al and Ted's Honey Shop—Helena, Mont.
Carl Soder—Stratford, Iowa.
Marvin Wahls, Chenoa, Ill.

Picture made during a TV broadcast at Greensboro. George Perry at left and W. A. ("Steve") Stephen at right. Lettering in comb was scratched into comb, a trick worthwhile. At the Southern Federation meeting, a special workshop is being held, conducted by specialists in TV and radio to show how to put on a program.

Winners

Class A Liquid Clover Honey—

1. Henry F. Puppe, Nebraska City, Nebraska.
2. Wm. J. Wallanches, Downers Grove, Illinois.
3. Al and Ted's Honey Shop, Helena, Montana.

Class B Light Colored Honey, other than Clover—

1. Elmer L. Smith, Benton Ridge, Ohio.
2. Willard W. Smith, DeLand, Ill.
3. M. C. Morgan, Blue Mound, Ill.

Class C Golden Colored Honey—

1. Wm. J. Wallanches, Downers Grove, Illinois.
2. Elmer L. Smith, Benton Ridge, Ohio.
3. Kurt Ciper, Mt. Clemens, Mich.

Class D Amber Colored Honey—

1. Elmer L. Smith, Benton Ridge, Ohio.
2. Wm. J. Wallanches, Downers Grove, Illinois.
3. Kurt Ciper, Mt. Clemens, Mich.

Class E Dark Colored Honey—

1. Ira Bowers, Decatur, Illinois.
2. Kurt Ciper, Mt. Clemens, Mich.
3. Wm. J. Wallanches, Downers Grove, Illinois.

Class F Comb Honey—

1. Mrs. Ann Hathaway, Manhatton, Illinois.
2. Ira Bowers, Decatur, Illinois.
3. Rocke Apiaries, Eureka, Ill.

Class G Chunk Honey—

1. Wm. J. Wallanches, Downers Grove, Illinois.
2. John A. Larson, Taylor Falls, Minnesota.
3. Elmer L. Smith, Taylor Ridge, Ohio.

Class H Granulated Honey—

1. Willard W. Smith, DeLand, Ill.
2. Henry F. Puppe, Nebraska City, Nebraska.
3. John A. Larson, Taylor Falls, Minnesota.

Class I Beeswax—

1. Elmer L. Smith, Benton Ridge, Ohio.
2. Wm. J. Wallanches, Downers Grove, Illinois.
3. Carl Soder, Stratford, Iowa.

Class J Honey Use Exhibit—

1. Imogene Bowers, Decatur, Ill.
2. Helen's Apiaries, Welch, Minn. tie
2. Mrs. Louise Rocke, Eureka, Ill.
3. Mrs. M. C. Morgan, Blue Mound, Illinois.

American Beekeeping Federation Trophy, awarded to Henry F. Puppe, Nebraska City, Nebraska.

Montgomery to the Far North

B. E. Montgomery, of Purdue University, has a sub contract from the Arctic Institute of North America for a one month study of the ecology of bumblebees in the far north, at Point Barrow, Alaska, 300 miles from the Arctic circle. He will study the activities of bumblebees during the short arctic summer, especially the kinds of flowers from which they gather nectar and pollen and the development of colonies. This will be his second trip to distant places to study the bumblebee. In 1949-50 he went to New Zealand to study the relationship of bumblebees to clover seed production there. At Purdue, since 1950, he has also devoted some of his time to a study of the utilization of bees in the pollination of clovers and other legumes. He worked out a way to pollinate legumes and other crops by the use of bees in cages; allowing the production of three and four crops of seed a year in greenhouses, enabling plant breeders to make faster progress in developing new crop varieties. He also found a strain of clover that produces two seeds to the pod instead of one. It is now being tested to determine its value in increasing the productiveness of red clover seed.

Wisconsin Beekeepers Classify as Farmers

Under a new law in Wisconsin any beekeeper with 50 or more colonies and who is engaged in beekeeping activities is a farmer and is engaged in farming for all statutory purposes. This may solve some problems as far as truck licenses, taxes, and insurance rates are concerned. This ruling would eliminate anyone in the city with a few colonies of bees.

(Wisconsin Beekeeping).

Ridding Supers of Bees . . .

To remove bees from the supers when they are ready to take off, when a good flow is on and the bees flying freely, set the supers about 20 feet in front of the hives and wait an hour or so. Use very little if any smoke. The bees will all leave. It works excellently here when there is no robbing and no brood in the supers.

Paul J. Nichols, Douglas, Arizona.

ABIE STINGS SEZ:

Well, I just got goin' with my extractin. Maybe some folks would say I'm pretty late, but I always figures it's best to see whether there's any fall honey for proper winterin' before you start extractin' the summer crop.

Cooperators in the Check-Off Plan for Advertising Honey

Here is a list of those companies that are supporting the new check-off plan for advertising honey. Details of the plan were given in our August editorial.

Lose Brothers, Inc.
Busy Bee Farm
Florida Honey Cooperative, Inc.
Miner Products Company
Honeymoon Products Company
Champlain Valley Apiaries
H. J. Botsford & Company
Sanders Bee Hive Ranch
Felix Braun & Company, Inc.
Cox Honey Farms
Lush's Luscious Honey
Clover Bloom Honey Company
Clearbrook Honey Farms
Baker's Quality Honey
Roscoe F. Wixson
Walter G. Sagunsky
Howard Honey House
T. W. Burleson & Son
Superior Honey Company — all branches
F. D. Manchester & Son
R. B. Willson, Inc.
Morton Foods
Rocke Apiaries
R. D. Bradshaw & Sons
Sun Crown Food Corporation
Weaver Apiaries
Merit Food Company, Inc.
High Line Apiaries
Sioux Honey Association
Hamilton & Company
J. D. Manchester & Son
John J. Paton Company
Jack Gomperts & Co.
R. W. Barnes & Son
L. D. Taylor
Hudson Tea & Spice Co.
Kane Import Co.
A. I. Root Co. (Syracuse)

Editorial

Additional Research Will Help You

The June issue of the American Bee Journal contained an editorial with the following final paragraph:

"Research is the golden key that can open the door of unlimited opportunities for the bee and honey industry. Through RESEARCH the possibilities for progress are tremendous!"

We certainly were reminded of those thoughts when we announced happily in the August issue, as did the July-August issue of the Federation News Letter, — $100,000 INCREASE ASSURED FOR RESEARCH! This included $50,000 of increased funds for pollination studies, $25,000 additional for research on mechanical phases of beekeeping, and $25,000 more for honey research.

Consequently we want to take this opportunity to congratulate Clarence L. Benson, Chairman of the Federation's Research Committee, his committee members and the officers of the American Beekeeping Federation who have contributed much of their own time and money to accomplish the appropriation of funds needed to expand a research program that can open the door of unlimited opportunities for your future and mine. We especially commend Clarence Benson, the committee's chairman, and Henry Schaefer, President of the American Beekeeping Federation.

Consider what research has meant to petroleum, soy beans, citrus and many, many other commodities. Then consider what this additional research can and should mean to the honey industry. It is, indeed, the golden key to tremendous possibilities for progress.

Consider, also, that this is but one of many accomplishments of the Federation—the organization which is working unselfishly for you and for me. If you are not now a member, JOIN TODAY! Send your membership dues to Robert Banker, R. F. D., Cannon Falls, Minnesota. The Federation needs your support—it certainly deserves your support, and you certainly need the American Beekeeping Federation.

Orderly Marketing Plus Honey Promotion

Orderly marketing and a stepped-up honey promotional program are two factors which can make it possible for honey producers to obtain better than average prices for their crop.

In its August issue, Gleanings in Bee Culture urged producers not to give away their crop. They pointed out that the beekeeper's selling price should be based on **cost of production, cost of selling, and margin of profit.** They said, "It costs money to produce honey nowadays. Honey is too fine a product to be given away. Beekeepers are entitled to a fair margin of profit." We certainly endorse this.

Following the Denver meeting of the Executive Committee of the American Beekeeping Federation, a special news release was issued which appears elsewhere in this issue. They said, "Taking the favorable market conditions into consideration, it would seem with good participation in the promotion program at the producer and packer level and orderly marketing, **honey should continue to move at good prices."** They, as did Gleanings, urged producers to take advantage of the Loan and Purchase Agreement programs if you need funds to finance your operations until market conditions are more favorable. We certainly endorse this.

And NOW is the time to plan for your part in the honey promotion work. Joaquin Watkins, Chairman of the Federation's Marketing Committee, tells about the work they are doing this year to promote honey in a short article elsewhere in this issue, entitled "Crop and Market." And he urges producers and packers to participate fully in this fall's honey promotion campaign. Regional and state marketing chairmen are making many plans. It will be the most extensive and best promotion the industry has ever sponsored. **NOW is the time to plan to do your part in your own area.**

By each of us doing our part to promote the sale and consumption of nature's finest sweet, and by orderly marketing, we all can be assured that honey will continue to sell at good prices.

Sue Bee Says:

Market your HONEY and BEESWAX through the SIOUX HONEY ASSOCIATION, with thirty years of experience in serving beekeepers, whose interests are identical to yours.

New Sue Bee Foundation

is second to none and can be made up on an economical exchange basis. Whether you need foundation or not we are always in the market for your beeswax. Our rendering facilities can handle all kinds of wax and comb rendering. Give us the opportunity to show you satisfactory returns in pounds of wax obtained from your combs and slumgum at very nominal cost.

We carry a full line of Foundation, Containers, Extracting Equipment, Woodenware, Carbolic Acid, Cyanogas, Smokers, Gloves, Veils, Hive Tools, Paint and many other items. Contact us for all of your needs.

The finest Laboratory in the Middle West is maintained by this Association in Sioux City. We will test your honey, beeswax or suspected bee diseased combs free. Write or Phone us.

A membership in the SIOUX HONEY ASSOCIATION is valuable to every beekeeper, large or small and your inquiry about membership will be welcome.

Sioux Honey Association

Sioux City, Iowa

Lima, Ohio; Rogers, Texas; Tacoma, Washington; Anaheim, California

The Market Place . . .

BEES AND QUEENS

QUEENS FOR SALE — Gray Caucasians personally raised, good workers, gentle, winter well. Price $1.00 delivered. Elbert S. Childs, 201 Garden Ave., Knoxville 18, Tenn.

SEPTEMBER—THE BEST TIME TO REQUEEN. Requeen with the best queens that money can buy. $1.00 each. Milton Stricker, R.F.D. 1, Annandale, N. J.

THREE BANDED Italian bees and queens —Two extra good strains, Dadant's Starline Hybrids and our regular strain. Starlines, 1 to 25, $1.30; 25 to 100, $1.20; 100 up, $1.10. For the regular strain deduct 25c per queen. Alamance Bee Company, Graham, N. C.

CAUCASIAN BEES and QUEENS — Very gentle and good workers. Also easy to handle. 1 to 25, $1.00; 25 up, 90c each. Black River Apiaries, Currie, N. C.

NORTHLAND ITALIAN QUEENS — For production, $1.00 each; 10 up, 90c. Shirl Baker, Rodney, Mich.

LIGHT 3-BAND ITALIAN queens, 80c; 20 or more, 75c. Luther Pickett, Efland, N. C.

GOLDEN ITALIAN bees and queens—Real gentle and easy to handle. Select untested queens, 1 to 25, $1.00; 25 up, 90c. Carolina Bee Farm, Graham, N. C.

CAUCASIANS — Very hardy, long lived, gentle, good workers, personally raised. Young laying queens, $1.00 each. Fred Brock, McDonald, Tenn.

FOR SALE

60 colonies of bees, new supplies and one-year-old supplies. 2-frame extractor, steam knife, Coleman heater to make steam, 80-gallon tank, copper strainer and tub. Supplies for 100 colonies. A. L. Duke, Kemah, Texas.

FOR SALE—1500 colonies in northern Minnesota, complete with honey house and equipment. Parent Apiaries, Fertile, Minn.

100 colonies 10-frame equipment, full depth supers, $10.00 each. Leonard Rhodes, 207 Minter, Uvalde, Texas.

60 double brood nest 10-fr. colonies and equipment in good shape. Crop included. No disease. Martin Sebby, Fingal, N. Dak.

FOR SALE—About 200 colonies in 3 brood chambers, heavy with stores. All supers, equipment and machinery included. A complete set-up for beginner. In southeast Wisconsin. Write H. R., c/o American Bee Journal.

170 colonies in Illinois. Ten dollars each. Write for photographs. Walter Taylor, 208 Thomas Ave., Evansville, Ind.

ROOT automatic honey extractor No. 4327, 4-frame. Also 50-gal. round tank. Verna Johnson, Rt. No. 4, Waterloo, Iowa.

CASH for 2,000 Eatmore or older Root window cartons, either beeway or plain. John Rieley, Beaverton, Mich.

FOR SALE—Steam boiler with oil burner, McElhany uncapping machine and Brand capping melter, Woodman steam wax press. Lifetime eight-frame extractor, $400.00. Dovetailing machine for hive bodies, in perfect condition, $200.00. P. M. Williams, Castleberry, Ala.

FOR SALE—8-frame Root equipment for 700 colony apiary. Write for details. E. H. Wadleigh, Monte Vista, Colo.

HONEY and BEESWAX WANTED

WANTED—Comb honey in shallow frames, extracted in 60's. Quote best cash price and mail samples. Stoller Honey Farms, Latty, Ohio.

HONEY WANTED—Our truck will pick up your honey and wax. Driver will pay you cash. Tideswell Supply Co., 2711 No. 63rd, Omaha, Nebr.

WANTED — All grades of extracted, also comb honey. Honeymoon Products Co., 39 E. Henry St., Box 85, River Rouge 18, Mich.

WANTED — Honey and beeswax. State what you have and price. Roscoe F. Wixson, Dundee, N. Y.

HONEY NEEDED — Cut comb and both white and light amber extracted. Describe what you have. Clover Bloom Honey Co., Inc., Box 56, Minco, Okla.

WE ARE PAYING top prices on beeswax and honey shipped to one of our plants. Sioux Honey Assn., Lima, Ohio; Rogers, Texas; Anaheim, Calif.; Tacoma, Wash.; and Sioux City, Iowa.

HONEY WANTED—All grades and varieties. Highest cash prices paid. Mail samples. State quantity. HAMILTON & COMPANY, 2613 South Yates Ave., Los Angeles 22, Calif.

WANTED—Honey, amber or light, in any amount. Send sample for prices. Holland Honey Cake Co., Holland, Mich.

WANTED—Extra white and light amber honey. Let us ship you the containers. Sell us your honey for CASH on delivery. The Hubbard Apiaries, Manufacturers of Bee Supplies and Comb Foundation, Onsted, Mich.

WRITE FOR SHIPPING TAGS and current quotations on rendered beeswax. Any amount from one pound up bought. If you have 25 pounds or more, save 25% by letting us work it into foundation for you. Walter T. Kelley Co., Clarkson, Ky.

CASH PAID for white and amber extracted honey. Send samples and state quantity available. Prairie View Honey Co., 12303 Twelfth St., Detroit, Mich.

HONEY FOR SALE

TRY Smith's fancy comb and extracted honey. Smith Apiaries, Clayville, N. Y.

FOR SALE — Mangrove honey in 55-gal. open head drums. Also few 60-pound cans. F. H. Nelson, Murdock, Fla.

PROFESSOR LUERSSEN'S white clover honey in new 60's. Triple filtered, pasteurized, priced right. 1301 E. Washington, Bloomington, Ill.

WHITE CLOVER HONEY in sixties. Ralph Gamber, 910 State, Lancaster, Pa.

POSITIONS AND HELP WANTED

ELDERLY BEEMAN to help with honey crop. Pensioner preferred. Ohmert Bee Farms, Dubuque, Iowa.

WANTED

WANTED TO BUY — 300 to 500 colonies bees in alfalfa irrigated district of New Mexico. P. O. Box 806, Farmersville, Texas.

WANTED—400 colonies bees on permanent locations in north central states. Charles Leathco, 80. Garey and Riverside Dr., Pomona, Calif.

WILL BUY approximately 500 colonies with equipment and locations. Frank Stewart, 5447 Zelzah Ave., Encino, Calif.

WANTED — Used Lifetime extractors — geared honey pump — Bogenschutz uncapper. Stewart Apiaries, Fairfax, Mo.

SUPPLIES

BRAND MELTERS and all kinds of bee supplies. Catalogue free. Hodgson Bee Supplies Ltd., 565—13th Ave., New Westminster, B. C.

HONEY LABELS

Improved designs, embodying color, balance, simplicity, and distinction. Please send for free samples & prices.

C. W. AEPPLER COMPANY

Oconomowoc, Wisconsin

THE BIGGEST BEE SUPPLY CATALOGUE PUBLISHED (64 pages) free for the asking. Big factory manufacturing a complete line of wooden goods, comb foundation, metal goods, veils and gloves, carloads in stock, daily shipments, save 20% WALTER T. KELLEY CO., CLARKSON, KY.

WRITE FOR CATALOGUE. Quality bee supplies at factory prices Prompt shipment. Satisfaction guaranteed. The Hubbard Apiaries, Manufacturers of Beekeepers' Supplies, Onsted, Mich.

SEEDS AND TREES

HONEY PLANTS our specialty. Catalogue on request. Pellett Gardens, Atlantic, Iowa.

MISCELLANEOUS

AUSTRALIAN BEEKEEPING — Read all about it, $1. Australian honey flora, $1. Rex. Peacock, Kerang, Victoria, Australia.

RANCH MAGAZINE—Do you find it difficult to secure information about sheep and sheep ranching methods? The SHEEP AND GOAT RAISER reaches more sheepmen with more information of range sheep than any magazine published. Subscription $1.00. Hotel Cactus, San Angelo, Texas.

BEES removed from house or tree to hive without touching either house or bees. Bees will then move honey into hive. Save property, honey and bees with my method. Send $2 for details. Satisfaction guaranteed. George Hawkins, Rt. 1, Lawson, Mo.

KNOW interesting facts about the bees of India through the INDIAN BEE JOURNAL, published in English by the Bhupen Apiaries (Himalayas), Ramgarth, Dist. Nainital, U.P., India, and obtainable from them. Subs. Rs9/-, or $.15/-, or $2.25 yearly. Sample copy, post free, Rs.1/8/-, or $.2/6 or 40c (International money order). Payment in mint postage stamps of your country accepted.

Ventilation . . .

In hot weather bees often gather in close packs in the hive entrance and do not go out to gather nectar. I find that by moving the top super forward a half to three-fourths of an inch air is allowed to escape at the top of the hive. As this leaves an open space at the back of the super, allowing rain to enter, I fasten on a two inch strip to close this space. This leaves the bottom of the top super an inch away from the hive so the air can get out. The lower hive body is also raised off the bottom board about two inches. Thus the air can circulate as in a chimney and the more supers there are the better the draft. The bees are more contented and they do not gather at the entrance or at the top opening.

Col. Michel Jacobs, Rumson, New Jersey.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912 AND MARCH 3, 1933 of American Bee Journal, published monthly at Hamilton, Illinois, September 1, 1955.

STATE OF ILLINOIS
County of Hancock—ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared M. G. Dadant, who, having been duly sworn according to law, deposes and says that he is the business manager of the American Bee Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the name and addresses of the publishers, editors, and business managers are:

Publishers: American Bee Journal, Hamilton, Illinois.

Editors: G. H. Cale, Hamilton, Ill., M. G. Dadant, Hamilton, Ill., A. Larson, Hamilton, Ill., R. A. Grout, Hamilton, Ill.

Business Manager: M. G. Dadant, Hamilton, Ill.

2. That the owners are: Dadant & Sons, Inc., Hamilton, Ill.

3. That the known bondholders, mortgagees and other security holders owning or holding one per cent or more of the total amount of bonds, mortgages, or other securities are:

Stockholders:

H. C. Dadant, Hamilton, Ill.
M. G. Dadant, Hamilton, Ill.
L. C. Dadant, Hamilton, Ill.
R. H. Dadant, Hamilton, Ill.
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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears and upon the books of the company as trustees or in any other fiduciary relation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

(Signed) M. G. Dadant,
Business Manager American Bee Journal.

Sworn to and subscribed before me this 23rd day of August, 1955.

Minnie King, Notary Public
My commission expires Mar. 25, 1958

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CROPS and MARKETS

by M. G. Dadant

Crop So Far

In the eastern half of the country, the crops are pretty well over except for the fall crop. Some parts of New England are better than a year ago, with the western part of Vermont probably shorter. New York has fewer bees and very scattered locations with probably as short a crop as last year, which was near failure. Extending down the east coast the Virginias, Maryland and the Carolinas the crop seems good this year. Georgia is almost a failure and Florida has not over 75% of 1954. Light crop conditions extend over Mississippi, Alabama and into Louisiana with the exception of the northern sections of these states. These together with Tennessee and Kentucky are better than a year ago.

Arkansas will be strongest, undoubtedly heavier than 1954 with New Mexico and Arizona probably less. Texas is better except that the Rio Grande valley is short.

In all central western areas except perhaps Pennsylvania, the crop is far better than in 1954 which was in itself a short crop. Pennsylvania may be an exception on account of dry weather.

Even in the plains territory the crop will exceed 1954 except possibly in the Dakotas. Montana will have difficulty in equaling last year's crop and crop on the east slopes of Colorado is definitely lower. However, the western slope is at least as good with the San Luis Valley much better.

Idaho and Nevada are definitely short and Utah similarly except in some southern sections. This applies also to some extent in Oregon and Washington and it is doubtful whether the California crop will run as heavy as last year partly due to the drought in the unirrigated areas and the fact that the orange crop itself was short.

Quebec has almost a flat failure and Ontario no more than last year, if as much. The western provinces are probably equal as is British Columbia. Canada will need honey to fill its requirements.

Prospects

Dry weather still lingers in many of the plains sections and even in the central west extending into Ohio and Pennsylvania. However, there is more possibility of aster and other fall flows than there was a year ago. The flow in irrigated sections is over. All in all, not too many prospects for much extra surplus honey.

Is Honey Ready?

Conflicting reports in this matter —there has been, however, a large number of beekeepers who realize the bareness of the market and have immediately extracted their crop and disposed of part of it. Likely 50% of the honey is off the hives and ready for distribution to packers and buyers. In fact, much of it has been sold to many anxious buyers, particularly the small packers.

Prices Offered

Prices as usual range from high in the east to lower as we go west. Apparently there is a tendency for an advance in retail price which will mean likely a higher price in bulk. We hear of very few offers on white honey lower than 14c in the eastern sections and, as a matter of fact, into the plains section, many beekeepers holding their crop for about this price. Farther west, offers range from 11½ to 12 cents per pound with the buyers not too eager to buy until the market is established.

We learn of one lot of 2,500 cans in Montana selling for 14¾c, f.o.b. shipping point and several turndowns of 13 and 13½ cents on other lots. This may be for Canadian import. No doubt with the short crop in the Canadian provinces, fewer beekeepers compared to 15 years ago and a heavier demand, the Canadians are going to need probably the equal of last year in importations of honey.

European buyers are holding off with a view to a lower price than at present offered. There is no export subsidy this year which, of course, will rule out some 20 million pounds which went in this manner last year. However, it is known that the demand is there if the prices can be met and there is always a possibility that the government authorities may reinstitute the subsidy. They have that right.

Condition of Honey Plants

On the whole, honey plant conditions for the fall and winter seem satisfactory except for many dry areas throughout the plains states and the central west and extending into the east in some cases. As this is being written, a drought still continues in our own section with no long range forecast of any break in the weather.

Conclusion

On the whole, honey this year is of extremely fine quality everywhere and, with a bare market to start on even though we may have a somewhat larger crop than in 1954, it does look like it could be absorbed without too much difficulty and at prices which will range from 1c to 2c above last year. It remains to be seen, however, how anxious the producers are for their money and how the demand continues on the part of the consuming public.

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To Keep Labels from Curling

To keep labels from curling when they are placed on the honey bottles, soak them in water until they lay flat. This will not injure the lustre on good labels and they just seem to grab hold when applied to the bottles without any smearing of the paste or glue. Let dry slightly on a few thicknesses of old newspaper before applying.

Paul J. Nichols, Douglas, Arizona.

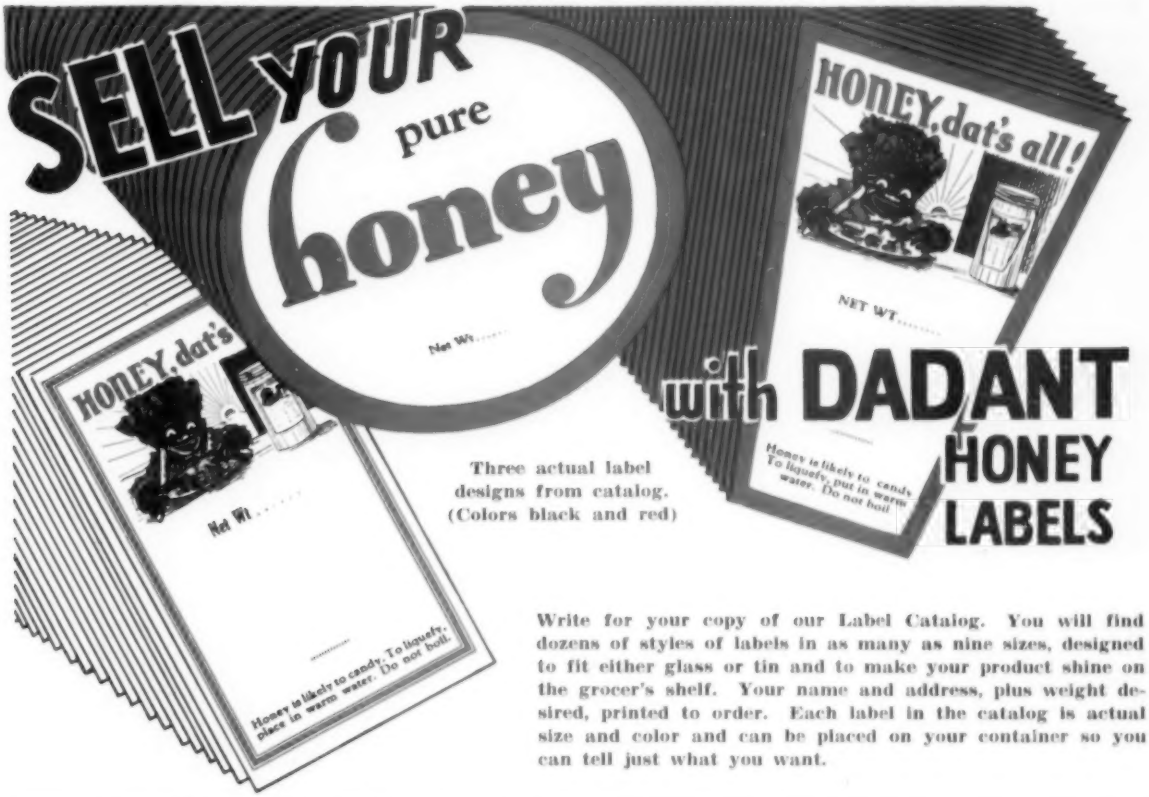
Minnesota Figures . . .

Minnesota is a top ranking state in the production of honey and wax. In recent years only California has produced a larger annual crop. The statistical division of the Minnesota Department of Agriculture shows these figures for the 1954 production: 19,440,000 pounds of honey, about two million more than the next highest producing state, Florida. (Circular 291-C-July).

To Clean Excluders . . .

To clean a few excluders set an empty hive body on a piece of sheet iron. An old metal cover is fine. Place five or six excluders on the hive body. Put a piece of glass over the excluders and set it all in the sun. The sun melts the wax as in a solor extractor.

Paul J. Nichols, Douglas, Arizona.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